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FROM all indications the production of silver in this country will be considerably greater this year than in 1890. Never before has there been so much activity in all the silver mining camps of the West as at present, and this is beginning to show in the greater output of ore. The lead smelters of Denver and Pueblo are pressed to the limit of their capacity to reduce the ore of this class which is offered, and there has even been some talk of the erection of new works at the latter place. The production of lead ore has not, apparently, increased, but the smelters are running their furnaces on low lead charges and are thus handling the greater volume of dry ores.

The general prosperity in the silver-mining industry throughout the West is particularly noticeable in view of the general business depression which has made itself felt throughout the past year in almost all branches of industry in the East. It is evident, as we have remarked before, that investors in the East are beginning to realize that there is no business so profitable as mining, sensibly and honestly conducted, and that mining undertakings are becoming more and more popular among them. The day of the twice or thrice overstocked mining company, and large profits to promoters, is gone; but any legitimate enterprise offered upon a reasonable basis will receive due consideration from the public.

MINING in the Joplin district, including the lead and zinc belt of Southwestern Missouri and Southeastern Kansas, seems to be experiencing a boom. The mines of this region have been worked for the past twenty years or more, but up to four or five years ago remained comparatively in the background, although producing a considerable amount of lead and zinc ore, attention being attracted from them by the richer mines of the Far West. The steady profit at which they were worked, however, awakened new interest in the district, and many of those who had once worked there and gone further west, returned to the old camps. At the same time an influx of Eastern capital set in, and for the past two years there has been a large and steady growth of the mining interests of the region, which has been marked by a large increase in its production of lead and zinc ore. The great increase in the production of lead in the soft-lead producing States in 1890, in which year it amounted to 58,000 tons, as against 34,000 tons in 1889, was largely due to the increased production of Joplin.

During the current year a good deal of capital has been invested in the district, and a general expansion in operations has taken place. Exploration work has resulted in the development of several new and promising camps in the country adjacent to the Joplin district proper, and mining operations in the older camps are beginning to be conducted in a more systematic manner than heretofore, so that there is prospect that the output of these mines will continue to increase. The miners of Joplin have long been complaining that the capacity of their mines was in excess of the capacity of the spelter works, and have been agitating the erection of new works in the district. The schemes proposed did not come to anything definite, until within the past month, when a new company was organized to erect works at Galena, Kan., for which, we are informed, ground has already been broken.

THE FEDERAL MINING LAW.

The letter of Mr. A. Hausmann, of Leadville, Colorado, published in this week's JOURNAL, seems to call for comment. Mr. Hausmann has my entire sympathy in his complaint that the present U. S. Mining Law, so far as it concerns lode locations, is obscure, awkward and unjust. But I do not think he correctly states the actual provisions of the law, or the needed legislative remedy.

The Sections of the Revised Statutes constituting what is called the mining law, and replacing the Acts of 1866 and 1872, with some minor Acts, may be divided under two general heads. The first comprises those provisions which open the public mineral lands (except in certain States) to free occupation and exploration, authorize the sale of such lands, and prescribe the method in which application may be made and patents for the land may be obtained. Prior to such legislation, these mineral lands were withdrawn from sale, and the exploration and occupation of them was legally a trespass.

The second head comprises the grant of peculiar rights to the owners of locations upon lodes. The Sections, such as 2,320 and 2,322, which condition this peculiar grant, are not those which authorize the exploration and sale of the lands or the granting of patents; and if they were struck out of the Statutes to-day, with all passages referring to them or dependent upon them, there would still be complete authority for the location of mining claims and the issue of patents to the purchasers of mineral lands.

Your correspondent is in error when he complains that the law makes no provision for mineral deposits which are neither lodes nor technically placers. Section 2,329 distinctly provides for such deposits that they shall be classed, for the purpose of administration, with placers. This is not the same thing as saying that they are placers—though much nonsense on that subject has been talked before Western juries for the purpose of prejudicing them against claimants of mineral land who, having no proofs upon which legal lode-locations could be based, were obliged to act under the provision referred to.

If the special lode-privileges should be abolished, as they ought to be, then lode claims also would be included (just as lime quarries now are) under the same regulations as placers. Section 2,329 now provides just as completely for all mineral deposits not lodes and not placers as if it explicitly enumerated and defined all possible varieties of them.

Nor is it true, as your correspondent thinks, that rights of prior locators are ignored by the government in the issue of a patent. His misconception of the situation in this respect is surprising. The truth is that the law gives to lode-locators a privilege which is not granted to any other class of occupants or purchasers of public lands. Everybody else must give some notice to the United States as to the tract of the public domain which he intends to acquire, and must proceed within a certain specified time to take and pay for it. But the lode-locator acquires a title from the

moment of location, and without any notice to the government; and this title he may maintain for years (by complying with certain conditions), without ever paying for the land he has occupied. There are many thousands of such titles in force to-day, covering tracts which are still carried on the maps and records of the Land Office as public land. In most cases, it is not until proceedings are begun to take a patent on such tracts that the government receives any notice that they have been occupied and claimed.

The chief conditions of maintenance of these possessory titles are: regularity of lode-location, obedience to local regulations, performance of annual "assessment work"—and one other, to which I would call special attention.

Namely, when an applicant presents himself, desiring to purchase a given mining claim, which is still, so far as the Land Office knows, public land, the law requires public advertisement to be made for 60 days. And any person who is occupying a part of the tract thus applied for, under a possessory title of which the government has had no notice, is obliged to come forward and assert his claim within the sixty days, or else lose his rights. In the presence of such an adverse claim, asserted under Sections 2,325 and 2,326, all proceedings are stayed until the controversy has been settled. The pathetic case stated by your correspondent cannot occur, unless the prior locator neglects the duty of asserting his claim.

The practical situation is this. The government says to the citizen: "My mineral lands are for sale. But you may locate a lode-claim anywhere on these lands, and hold it and work it as long as you like without saying a word to me or paying a dollar for the wealth you carry away. Only you must obey certain regulations for the maintenance of this peculiar title; and one of them is, that if anybody else comes forward and offers to buy the whole or a part of the land you claim, you must let me know that you claim it, so that I shall not sell it to him by mistake. And if upon due public notice you do not assert your claim, I must be free to sell the land. If you don't like this condition you had better offer to buy the land yourself."

The notion that such an arrangement involves injustice to the lode-locator is too absurd for argument. If there be injustice, it is shown towards the *bona fide* applicant for mineral land, who offers to buy it and pay for it, but cannot find out whether the government really owns it until he has gone to the expense of surveys and advertisement, with their attendant delays. The United States is probably the only civilized nation in the world which offers lands for sale, but cannot tell whether it owns them or not without waiting for at least 60 days to find out, and which may (and frequently does) find out that lands of which it supposed itself the owner have been granted under possessory title to parties of whom it never had any record; for it must be remembered that the record of a lode-location is not made in the United States Land Office.

Your correspondent's vague allusion to "the Iron Company's" case at Leadville is not accurate. The Iron Silver Mining Company, to which I presume he refers, has had many lawsuits instead of one; and no one of these exactly answers his description.

His recommendation that the law should make a distinction between "fissure veins" and other deposits is a step in the wrong direction. There is nothing about a fissure vein to entitle it to such a distinction, as compared with a well-defined and regular bed, or impregnated stratum, or contact-deposit.

Nor is it necessary to go to foreign countries for examples of equitable codes in successful operation. In most cases the foreign codes do not contemplate the sale of metal mines at all, but the grant of licenses to work them, and the payment of royalty. This would be a false guide for the United States to follow. The true precedent is the American one, which is illustrated in the copper mines of Lake Superior, the lead mines of Missouri, the gold mines of the Southern States and the iron mines of New Jersey—not to mention innumerable other examples. Who ever heard of mining litigation under this system, involving geological and legal subtleties, such as infest the West? The purchaser of the land takes the minerals with it—and there an end.

Nor is it true that the lawyers made, and have continued for selfish reasons, the present Federal law in the West. It was made to conform as far as possible to the customs of the miners. Lawyers have repeatedly proposed to reform it, and it has been retained by the miners and prospectors who think it gives larger speculative opportunities to larger numbers of explorers than could be had under a system of simple and secure titles, easily obtained. Under such a system, the discoverer of a valuable mine could get the whole benefit. Under the present system, he or his grantee usually has to divide with a considerable number of claimants under one or another provision of the law. The *second-comers* want to retain this speculative *bonanza*, and hence they do not wish the rights of the first-comers to be too clearly defined.

To recapitulate: the real trouble with the law is this. Certain special and exceptional rights are granted to lode-locators upon certain conditions. These rights are not defined beyond controversy by the patent of the United States. The holder of a lode-patent (that is, of a patent for a tract of mineral land originally located as a lode-location) is protected in several respects:

1. He has complete title to the ground itself, and all its contents, except lodes belonging to other owners, and he is obliged neither to do annual work under Federal and local regulations, nor to file an adverse claim under penalty of entire loss of title, when the application of some other party interferes with his rights.

2. He is protected against all adverse claims originating before his own, such claims, though they may have been valid, being entirely destroyed, unless they were legally pressed within the period provided by the Statutes, before the issue of the patent.

It may be said, therefore, that the owner of the United States patent (obtained without fraud) is entirely secure in the possession of what the patent actually conveys to him. But the important question, What does the patent convey? is not answered by the mere exhibition of it. For if the lode-location was not made "on" a lode of which it contains the apex, and of proper form with relation to the said apex, then all the extra-lateral lode-rights supposed to be, and declared in the text of the patent itself to be, conveyed by it, are null and void; and the patent is just like an agricultural or placer patent, simply a deed for so much land with its contents (except lodes otherwise granted).

Now, the only way in which this all-important question can be settled, and the extent of the grant of the United States patent can be determined, is by litigation and judicial decision. It follows that the developments of mining may at any time put the mine-owner in danger of a decision which will destroy the value of his property, and render worthless all his previous expenditure of capital.

Additional definitions in the law, while this system remains otherwise unchanged, would make matters rather worse than better. Suppose, for instance, that a "lode" were declared to mean only a "true fissure vein," or that lodes having less than a given dip below the horizontal were excluded under Section 2,322. The result would be more uncertainty and more litigation than ever, with no benefit to anybody except lawyers and experts.

The true reform is to deliver the mine-owner, so far as his title is concerned, from all experts except the surveyor, thus putting him in the simple and safe position occupied by all other purchasers of government land. He ought to know, when he buys and pays, exactly what he gets, and he ought to get it in spite of fissures, dips, spurs, angles, strikes, faults, vein-matters, gangues, gouges, assays, values and whatever else may be conjured up to worry him underground. The only way to give him this is not to multiply definitions, but to abolish them; not to emphasize geological distinctions, but to take them away. In short, the principle of the "square location," under which all mining titles in the older States are regulated without the slightest difficulty, could be applied with equal ease in the far West. So long as the present absurd law remains, it might as well be construed by the courts as amended by Congress. No amendment short of the abandonment of the principle of extra-lateral lode-rights will cure its defects. R. W. R.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.
All letters should be addressed to the MANAGING EDITOR.
We do not hold ourselves responsible for the opinions expressed by correspondents.

Mining Notes from Alaska.

A few mining sales of minor importance have been made in Alaska this season, but several larger ones are talked of. A Denver mining engineer was here recently and examined several promising properties, and offered cash for them, but his offer did not quite satisfy the owners, although $30,000 would seem to be a pretty fair price for a prospect.

The Nowell company, in Silver Bow Basin, has been washing steadily, and about 10 acres of surface, with a depth of 5 ft. to 30 ft., have been washed, which includes much of what should be its best ground. I do not think that the yield of gold from this season's work will be sufficiently great, from present indications, to enable it to work up much of a boom on its placer mine stock. The gravel in this section of the Basin is of less extent and of poorer quality than I had expected. Still, Mr. Nowell may be able to raise a little boom for his stamp mill by a judicious use of the few rich quartz boulders which have been found in his placer mine.

At the Treadwell mine the underground development work is nearly completed on the first levels and ore can now be taken from this part of the mine whenever needed. Last winter there was much trouble and considerable danger in working in the open pit or quarry, and it is probable that much of the work this winter will be in the new workings below ground.

At the Silver Queen work progresses slowly and the tramway from the ore chute to the mill is nearly completed, which will enable the company to handle more ore at a less expense. At the Willoughby mine everything is moving along well; the owners will probably increase their mill by adding 10 stamps in the coming spring. This is one of the best situated mines in Alaska, as it can be worked without trouble all the year, while many of our mines can be worked only eight or nine months, owing to the altitude and distance from salt water. Prospectors are just beginning to come in from their summer trips; some of them are showing very favorable rock. W.

Alaska, Sept 11, 1891.

The Free Coinage Discussion. Views of Mr. T. E. Willson.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Will you kindly permit me to say that in reply to my articles you entirely misapprehend and strangely misapply what I wrote. When I say that the world's stock of silver "available for coinage" is 2,000,000 tons, I mean, of course, that this is the amount over and above that used in manufactures, and it includes necessarily both that already stored in coinage and that awaiting coinage. As the Director of the Mint reported less than a year ago 1,914,000 tons stored in coinage, I added only 84,000 tons as out of coinage to make the total. To the amount of gold reported in coinage last year I added the average amount coined (less recoinage) yearly, to bring the figures to date. How "available for coinage" can mean anything else, or what you imagine it means, needs explanation.

I said that "intrinsically an ounce of raw silver is worth more than the same weight of raw gold." I did not say, as you supposed, that its extrinsic value in coinage now or at any time was equal to gold; but I can tell you when and where an ounce of gold was worth less than an ounce of silver, both intrinsically and extrinsically, and that was in Mexico under the Montezumas, as you will see by referring to Prescott.

Your ratio figures are out of a fairy tale. They never existed. They do not now exist. They never can exist, as any schoolboy who has studied physics should know. The only ratios that can exist must be *under similar conditions*. What is the ratio between legal tender (coined) gold and silver? What is it between bar gold and bar silver under free coinage? What is it under closed mints? You know that it never has had, *under the same conditions*, the ratios you name. No value ratio can exist between gold measured in coinage and silver out of coinage, for the same reason that no gravity ratio can exist between iron weighed in water and steel out of water. The gold and silver ratio is a question of specific value, corresponding to specific gravity, and each metal must be valued in coinage to get the one, as it is weighed in water to get the other. Would you take a cubic foot of iron and weigh it in water, and a cubic foot of steel and weigh it in the air, and then tell your readers the specific gravity ratio of steel to iron was 7 to 1? That is exactly what you do in values to get your unscientific and nonsensical ratios between gold and silver. You value the gold in coinage and the silver out of coinage, although you know better than to weigh the iron in water and the steel out of water.

Misapprehending its value and importance, you cut out of my article the vital points at issue between gold and silver camps: that "coinage is the safe storage at interest, in legal tenders, of bar gold and silver;" that "bar silver cannot be valued in coined gold, or bar gold in coined silver, as money metals," and that "the difference in value between 412 grains coined and 412 grains in bar must always be the cost of coinage" and can never be anything else. On these three fields the battle must be fought. All other questions are immaterial, and these material questions you avoid.

T. E. WILLSON.

[It is unnecessary to say if we misapprehended and misapplied Mr. Willson's views on this question in our issue of September 19th, it was quite unintentionally. We frankly confess we do not understand Mr. Willson's views when he says in a letter accompanying his communication "I put the coinage question on a mathematical basis and found that every phase and form of it could be solved with mathematical exactness and transferred back into work and back into heat." Mr. Willson should without delay give this mathematical demonstration and settle this much vexed question.—[ED. E. & M. J.]

Our Mining Laws.

EDITOR ENGINEERING AND MINING JOURNAL.

SIR: The United States contributed to the world's stock of precious metals in 1889 $32,886,000 worth of gold and $66,396,686 worth of silver, or together nearly $100,000,000 in value. An industry of such importance ought to be encouraged and protected by judicious legislation. Laws are presumably made to uphold a peaceable state of society, necessary to the free development of industries, to guarantee undisturbed possession of property obtained in a legal, rightful manner and to decide conflicts or disputes about possession upon the merits of the facts. If the United States mining laws were made for this purpose they must be considered a dismal failure; but if they were made to accomplish the opposite object, to obscure titles, to make mining property insecure, to encourage dishonest practices and cause endless litigation and conflicts instead of preventing them, they must be admitted a crowning success. Whoever deems this statement too severe and sweeping is recommended to study the map of any mining district in Colorado, especially Leadville, and see how the claims cross each other in all directions and are sometimes piled on top of one another, three or four deep. A crazy quilt is a model of regularity compared with this inextricable tangle of lines, angles and corners. An attempt to unravel this intricate puzzle and bring sufficient order into this chaos, to prove the priority and validity of titles, is often such a hopeless task, even for the best legal talent, that the counsellors of contesting parties have been actually known to recommend a compromise, recognizing the utter impossibility of ascertaining the facts of the case.

If we compare the relations of mining property in European states, or in Mexico and South America (where the mining laws are derivatives or slightly altered copies of the Spanish code), we do not find any such confusion and uncertainty of titles, and the question will naturally present itself, why is it that our mining laws are so defective and insufficient. Must the cause be sought for in peculiar natural, topographical and geological conditions, or in our political organization? Since the geological conditions are in their main features the same all over the earth, the legislative bodies must be blamed for this very unsatisfactory state of affairs. That the laws themselves (and not their non-observance) are really the cause of litigation, is plainly demonstrated by the fact that there is less conflict and greater security of property in remote mining camps, where the miners represent simultaneously the legislative and executive power, than in the old camps, where courts are established and everything has to take the legal course.

Our laws are defective in two respects, regarding the geological requirements and the method of acquiring titles respectively.

Concerning the subject they are intended to cover, the natural deposits of precious metals (other valuable minerals do not interest us here), they apply only to two kinds of deposits, placers and veins. All rules governing the location of so-called lode claims are based upon the supposition that the mineral occurs in a more or less vertical vein, the course of which may be easily determined by tracing the outcrop on the surface, and the prospector is expected to locate his claim along this apex so as to cover equal distance on each side. That mineral might be found in other deposits, different from the regulation fissure vein, seems never to have occurred to the makers of these laws, and this unpardonable omission and neglect has become the source of interminable litigation. A well known case arising from this deficiency was that of the Iron mine near Leadville, whose original discoverer laid out his claims along the outcrop of the inclined deposit in good faith, the law allowing the mineral to be followed indefinitely on the dip. But a precedent was established by the decision of the court in this case and the vertical prolongation of the side lines recognized as boundaries of a claim.

It is obvious that a narrow strip of 1,500 ft. long by 150 ft. wide, intended to cover the outcrop of a vertical vein, is not the proper shape for a claim located upon a horizontal deposit. But the greatest litigation and conflict arises from the manner in which the title of a mining claim is conferred upon the original locator. Although the United States reserves the exclusive ownership of mineral land, it allows individuals to locate claims, and gives to states the power to determine the size and modify the conditions within the limits of the general laws. Thus we find the length and width of claims constantly changing (in Colorado from 100 to 3,000 ft. long and from 50 to 300 ft. wide) until 1872, when the length was permanently fixed at 1,500 ft., while the width still remained a variable quantity.

Notwithstanding that the United States laws explicitly state the conditions under which a person can locate a claim and hold it, the Government ignores this prior title entirely when issuing a patent. Thus, if a miner has located a claim and complied with the requirements of the law to the very letter, some one else may come along and survey over his claim, expend five hundred dollars for improvements and apply for a patent. Then the Government, which has granted a title to the first locator, disregards his prior rights entirely and issues a patent to the later location, or compels the rightful owner to appeal to the law, which is often equivalent to forcing him to abandon his right, because he has not the money to pay the costs of a lawsuit, or because the undeveloped claim is not worth the expense. And it is not even necessary to have mineral discovered in the new location, because the Government does not take the trouble to ascertain whether the conditions of the law have been complied with. Many a poor miner has been robbed of his property in this way. Not long ago it happened in Leadville that a location was made on a small vacant spot and a claim laid out over some old mines that had been using machinery and shipping ore for several years. Through some crooked transactions and a blunder of the Land Office this bogus location obtained a patent, and caused the older claims considerable trouble and expense.

What a mining suit means, no body can appreciate correctly who has not been through the mill. It means a great deal of money to pay and very little or no rights to receive. A mining trial by jury is a contemptible farce, especially when the "twelve good and true men" are selected from farmers, artisans and others who have never in their lives seen a mine. The more they hear of the technical evidence, of veins, walls, faults, cleavage planes, etc., the more bewildered and confused they become. And yet such incompetent and unqualified persons are to decide intricate points of law and scientific questions on which the experts disagree. To prove a plain, irrefutable fact in court, is next to impossible, because the truth is never ascertained directly by inspection, but only indirectly through the evidence presented in the court, the exhibition of maps, diagrams, etc., and the testimony of the witnesses. There is no difficulty in finding any number of persons willing to swear to the contrary, whatever it may be. The simplest and safest way to arrive at the true facts, to send a commission of competent persons to compare the facts on the ground with the statements in court, is never adopted. The great leniency and laxity of the courts in regard to the truthfulness of sworn testimony, has a very demoralizing effect upon the veracity of the witnesses. Owing to the dualistic nature of a mining title, one being provisory and conditional, and only the United States patent being absolute and final, the records are almost worthless as a proof of title for an unpatented claim, and it is a very laborious and difficult task to ascertain the true title to such mining property.

The remedy for these grave defects of our mining laws will be readily discovered if we compare them with those of other countries, for instance of Germany. The acquisition of mining property is made dependent upon the discovery of ore in place; the location is made under the supervision of the competent authority, the Mining Bureau, and all adverse claims have to be filed and settled before the land is conveyed to the locator and the deed entered on record. After this the title is perfect and lawsuits of the character we have here are entirely unknown. The amount of land granted for mining purposes exceeds the area of our claims from two to forty times.

Without entering into any details, we can comprise the principles upon which the mining laws ought to be reformed and amended under the following heads:

The laws ought to be adapted to all the various deposits of ore, and larger areas allotted to claims on deposits other than fissure veins. There should be but one title, and that should not be conferred upon the locator until any conflicts or adverse claims have been investigated and settled by a competent authority. No claim should be recorded before the title is perfect.

How is it possible that such miserable laws can remain in force without an attempt being made to abolish the glaring injustice and absurdity of the statutes? The reason is obvious enough. The laws are almost exclusively made by lawyers in whose interest it must be to preserve a code which made it possible that over ninety lawyers found at one time remunerative occupation in the new mining camp of Leadville. A large number of surveyors profit likewise by the imperfections of the law, the innumerable conflicts affording much opportunity for work. The parties most affected and injured by the present laws, the miners and prospectors, do not seem to comprehend the situation or they are too indolent to make an effort for reform.

A. HAUSMANN.

LEADVILLE, Colo., September, 1891.

AMERICAN INSTITUTE OF MINING ENGINEERS, GLEN SUMMIT MEETING, OCTOBER 6th—10th, 1891.

The sixtieth meeting of the American Institute of Mining Engineers, at Glen Summit, Luzerne County, Pa., was begun on Tuesday, October 6th, and concludes to-day. It was the most successful meeting of the Institute that has been held in a long time. The attendance was good, about 130 members being present. The papers presented covered a variety of subjects and were, on the whole, very interesting and, best of all, they were discussed freely. The latter point was the subject of very general comment among the members present, who were unanimously of the opinion that the great success of the meeting was due to the revival of this neglected custom. The only unpleasant feature of the meeting was the hard rainstorm which set in on Tuesday afternoon and continued through Wednesday and Thursday, interfering with the excursions planned for the former day. A change in the programme was made, consequently, the whole of Wednesday being devoted to the reading of papers and discussions, leaving Thursday open for the postponed excursions in case the weather cleared.

The following papers were presented at the meeting and read by title only: "Electricity in Mining as Applied by the Aspen Mining & Smelting Company," by M. B. Holt, Aspen, Colo.; "Electric Locomotives in German Mines," by Karl Eilers, Berlin, Germany; "The Manufacture of Liquid Sulphurous Acid in Upper Silesia," by Karl Eilers; "A Chinese System of Gold Mining," by Henry Louis, Singapore, Straits Settlements; "A Survey of the Planches de Plata Mine, Sonora," by Henry M. Stanley and Henry C. Flipper, Nogales, Arizona; "Co-Ordinate Surveying," by Henry O. Flipper; "Cordwood in the Matting Blast Furnace," by Herbert Lang, Mineral, Idaho; "The Bendigo Gold Field," by T. A. Rickard, Allemont, Isére, France; "Apparatus for the Manipulation of Iron and Steel Plates During the Process of Finishing," by Gram Curtis, Pittsburg, Pa.: "The Handling of Ingots and Moulds in Bessemer Steel Works," by Gram Curtis; "Tandem Tanks for Hoisting Water from Flooded Slopes," by J. H. Bowden, Wilkesbarre, Pa.; "The Utilization of Anthracite Waste by Gasification in Producers," by W. H. Blauvelt, Philadelphia, Pa.: "The Mining Resources of Honduras," by W. A. Thacher, Leadville, Colo.; "A New System of Ore Sampling," by H. L. Bridgman, Blue Island, Ill.; "The Iron Ores of Danville, Pa., with a Description of the Long-Wall Method of Mining Used in Working Them," by H. H. Stoek, South Bethlehem, Pa.; "Mining at Guanaguate, Mexico." by W. P. Blake, Shullsburg, Wis.; "The Determination of Nickel in Nickel Steel," by Albert Ladd Colby, Bethlehem, Pa. The remaining papers were read before the meeting, and each one received due criticism and discussion.

The opening session was called to order Tuesday evening by Hon. Eckley B. Coxe, chairman of the local committee, who made a few appropriate remarks, calling attention to the fact that the Institute, which would soon pass its twenty-first birthday, was founded in the region in which the present meeting was held; after which he resigned the chair to President Birkinbine. The latter took fuel saving as the subject of his presidential address. He spoke of the enormous increase in the coal production of the country during the past 20 years, as set forth in the recent statement of the Eleventh Census, and the improvements in methods of burning coal which had been made in the same time. As an instance of the great economy in the consumption of coal at the present time, as compared with 20 years ago, he contrasted the process of iron manufacture as carried on then and now. The *Transactions* of the Institute, he said, formed a record of the progress in fuel economy during the past two decades; there had not been an improvement made which had not been entered upon its pages.

After the election of new members and the transaction of other business, the reading of papers was commenced, that of Professor Richards on "A Hand Telescope for Stadia Work," announcing a very interesting and very important invention, being the first presented.

A HAND TELESCOPE FOR STADIA WORK; BY ROBERT H RICHARDS, BOSTON.

This is a new device for the measurement of distances in surveying by the stadia method, having the advantage that it can be applied to an ordinary telescope. Over the end of such an instrument is fixed a prism so as to cover one-half of the object glass, one edge of the prism coinciding with the diameter of the glass. In sighting at a graduated rod with this edge of the prism in a vertical position, two images, side by side, are prouced, one by the direct rays through the unobstructed portion of the object glass and the other by the rays bent by the prism. Rotating the telescope 90°, so that the edge of the prism is horizontal, the images are seen overlapping one another, the amount of overlap or throw of the bent ray image varying according to the distance of the observer from the rod. By reading off the amount of overlap of the bent image from the scale on the rod, the distance can be estimated. With a rod specially graduated the distance may be read directly; with an ordinary rod it may be determined by multiplying the reading by a constant. Professor Richards exhibited two telescopes which had been fitted with prisms in this manner. One, of 30 diameters magnifying power, had been tested at various distances up to 800 ft., the readings showing errors not exceeding 0·1%; the other, which was of only nine diameters magnifying power, had shown errors of less than 0·2% at the same distances, the smaller degree of accuracy being due to the fact that the prism used in this telescope was not achromatic.

In the discussion which followed the reading of this paper Hon. Eckley B. Coxe said that it was marvelous that this important instrument had remained undiscovered so long. It was very simple and would be of very great value in reconnaisance and geological work. Dr. Raymond remarked that it was not the first unexpected result that had been obtained from use of the prism. Many years ago when Bunsen first announced his great discoveries with the spectroscope, Professor Richter, now director of the Royal Mining Academy at Freiberg, constructed a crude instrument out of a child's telescope and a prism made of five plates of glass, filled with carbon bi-sulphide, and with it discovered a new element, indium.

In reply to an inquiry Professor Richards said that, so far as its principle was concerned, his new instrument should be accurate for any distance. Its range was only limited by the visual power of the observer. He had tried Iceland spar instead of a prism of ordinary glass, but had not found it suitable.

STREAM MEASUREMENTS AND RESULTS OBTAINED BY THE U. S. GEOLOGICAL SURVEY; BY F. H NEWELL, WASHINGTON, D. C.

This paper described the extensive and important series of tests which the U. S. Geological Survey is now making upon the water supply of the country, particularly of the West, its distribution, etc. The scope of the work and the methods of measuring the flow of water in rivers were briefly dwelled upon, and some results were given. The Yellowstone and Missouri were taken as typical Northern rivers. On January 1st, 1890, the discharge of the former at a point 10 miles below the Yellowstone National Park was 500 cu. ft. per second; in February it had risen to 600 cu. ft. per second; on April 5th, 1,000; May 1st, 4,000; May 31st, 12,000. It then fluctuated between 12,000 and 10,000 until July, when it began to fall gradually until December, when the flow was about the same as in January. In 1890 the variation was about the same, but the total volume of water was at all times somewhat less. The Missouri behaved in similar manner except that the flow was greater in 1891 than in 1890. Melting snow forms the principal supply of both these streams. The Salt River, in Arizona, a tributary of the Gila, is a typical Southern river. Here rain forms the principal supply, comparatively little water coming from snow, and it is in consequence subject to sudden floods, the maximum flow occurring in the winter. The flow of the Rio Grande was measured at three places, in Colorado above the big canals, in New Mexico, and at El Paso, Texas. On account of the water taken out for irrigation purposes the flow is no larger in New Mexico than in Colorado. At El Paso the river is now nearly dry at times of the year, on account of the large amount of water used for irrigation higher up.

Commenting upon this paper, Dr. Raymond referred to the great importance of this subject in relation to mining in the West, a supply of water being as necessary for that industry as for agriculture. The first step is that which the Geological Survey is now taking, viz., to find out how much water there is and its distribution. He compared Mr. Newell's diagrams with his own study of the Nile last winter, and stated that, so far as its floods were concerned, the latter was by no means an extraordinary river, popular opinion to the contrary notwithstanding. Still, being fed largely by rain, its rises were rather more sudden than in our Northern rivers. He also mentioned the admirable system of distribution of the water of the Nile. At low water time scarcely a drop reaches the Mediterranean.

Mr. Eckley B. Coxe commended the admirable system of measurement described by Mr. Newell, and remarked that young engineers erecting dressing or metallurgical works would do well to investigate the water supply the year round in a similarly careful manner. Mr. Birkinbine spoke of the report of Major Charles W. Raymond, U. S. Engineers, on the recent disastrous floods of the Susquehanna and Juniata rivers, and his conclusion that the preservation of timber by the State of Pennsylvania would only prevent their recurrence. Mr. B. E. Fernow indorsed this conclusion and said that the people of the West were awakening to the fact that forest preservation was necessary for water conservation, as was recognized by the action of the recent Irrigation Congress in Salt Lake City, Utah. In reply to a question Mr Newell said that observations of rainfall were being made by the Weather Bureau, and that so far it had been proved that the amount of rainfall in any one year and the volume of water in the rivers were not proportionate.

WEDNESDAY MORNING SESSION.

For the Wednesday morning session, "the practical uses of concentrated iron ores" was made a special topic of discussion, for which the two papers on magnetic concentration and the use of magnetic concentrates in the blast furnace were taken as the subjects. These were discussed very fully, a large number of members taking part, and the session was one of the most interesting of the meeting. As a preliminary, Mr. Eldridge's paper on the Florence oil field was presented.

THE FLORENCE OIL FIELDS, COLORADO; BY GEORGE H. ELDRIDGE, U. S. GEOLOGICAL SURVEY.

This was a very interesting description of the oil field which supplies a considerable amount of petroleum, which is consumed chiefly in Colorado. The paper is important as being the first published account of the geology of the district. According to Mr. Eldridge, the oil-bearing zone occurs in the Pierre formation, the lowest strata of the Montana group of cretaceous rocks, which is here about 4,000 ft. thick. The rocks in the Florence field form a synclinal basin, on one side of which all the wells so far have been found. Prospecting operations are much simplified by the fact that the rocks have been faulted only slightly, if at all. The field is about 14 miles long and 8 miles wide, but developments have been confined to within a radius of three miles of Florence, and the most important wells are in that town. The oil zone occupies about 1,900 ft. in the Pierre strata. The most productive wells are 1,155 ft. below its top, or 2,000 ft. from the surface. There is then about 350 ft. of barren ground, and then more oil is found. Below this is again 350 ft. of barren ground, and finally, at the bottom of the zone there are some small wells. The oil seems to have originated in the Pierre rocks. The percentage of producing wells to the number bored is 57½, and the wells yield from 5 barrels up to 250 barrels per day. The total yield of the district in 1890 was about 1,200 barrels per day.

In the discussion which followed this paper, Mr. Newell remarked that practical men have always treated the conclusions of scientific men concerning prospecting work with contempt. The result has been that petroleum has been found by blind prospecting in places where it never would have been expected and ought not to have been found. The structure of the Florence field is entirely new and it is impossible to draw trustworthy conclusions in regard to it.

THE PRACTICAL USES OF CONCENTRATED IRON ORES.

The discussion on this subject was opened by the reading of Mr. Hoffman's paper on "Practical Results of Concentration at the Croton Magnetic Iron Mine," and Mr. Langdon's paper on the "Use of Magnetic Concentrates in the Port Henry Blast-furnace." These papers will be reprinted in subsequent issues of the ENGINEERING AND MINING JOURNAL, and only a brief summary is necessary here. Mr. Hoffman states that the total cost of mining, and concentrating one gross ton of 68% ore, from 2½ tons of 38% ore, according to present daily practice at the Croton mines is but $1.95 per ton. The concentrates have been used in open hearth and blast-furnaces at various works and have given excellent results. Mr. Langdon state

that the experience with magnetic concentrates at Port Henry has demonstrated that there is no difficulty in using in the blast furnace at least 80% of high-grade concentrate, and that there is, especially in the use of a large percentage of concentrate, an economy of fuel beyond that which may be due to an increase of iron in the mixture.

DETERMINATION OF MAGNETITE IN TAILINGS.

Dr. Raymond opened the discussion by reading a communication from Mr. E. K. Landis, who said that it was wrong to determine the total iron contents in the tailings from magnetic separators as a basis of judgment of the work of the separating machine. Many of the silicious minerals which go into the tailings, such as hornblende, pyroxene, mica and apatite, contain iron, and these being non-magnetic, it is impossible for the magnets to catch them. Hence it is obviously unfair to charge all the iron of the tailings against the machine. There is, however, no satisfactory method of determining the amount of magnetite in these tailings.

Mr. Birkinbine read a letter from Mr. G. Woodbridge upon the same subject. The latter had found that all the iron minerals in Old Bed ores were attracted by the magnet when ground to a fineness of 100-mesh, and consequently it was impossible to determine magnetite in that manner; nor was there any more satisfactory chemical test.

Dr. Raymond remarked that 15 years ago Prof. Egleston read a paper on a system of mechanical analysis, at a certain stage of which the magnet was used to draw out *all* of the iron containing minerals. There was great doubt concerning this in the minds of many chemists, but it finally proved that Prof. Egleston was right.

Dr. Chas. B. Dudley suggested that the Thoulet solution (borotungstate of cadmium) might be used for this purpose.

Mr. Hoffman said that he had experimented at the Croton mines on the proper strength of the magnets of the separator, and had found that the amount of magnetite not attracted by those of ordinary strength was very small. The great points were to maintain a regular feed and keep the magnets clean.

Mr. Langdon said in reply to a question that the amount of flue dust made at Port Henry, while concentrates were being run through the furnaces, did not exceed five tons per month, although this was somewhat richer than the ordinary dust. About 2,000 tons of concentrates per month were used.

Mr. Kent thought that an approximate determination of the amount of magnetite in tailings might be made by the difference in the specific gravity of the minerals.

Mr. F. Firmstone remarked that no doubt sufficiently accurate results might be obtained by use of the Thoulet solution, the specific gravity of which is about 4, provided the ore were not too fine.

MAGNETIC CONCENTRATES IN THE BLAST FURNACE.

Dr. Dudley asked if the use of concentrates had any effect on the regularity of the output of the furnaces. He referred to a furnace with which he had been connected, which ran very irregularly, and for which no cause could be assigned except the fineness of the ore, which was of very soft, mushy character.

Mr. Langdon replied that formerly the Port Henry furnaces had been run on a run of mine ore, and that since concentrates had been used the products had been more regular than before.

Mr. E. S. Moffat corroborated Mr. Langdon, stating that the Lackawanna furnaces at Scranton had been run on concentrates for six years, and no irregularity had been noticed. The Lackawanna company was the first to use magnetic concentrates in the blast furnace to any extent. It had used 8,000 tons of from 60 mesh to ¼ mesh fineness. Concentrates commonly formed from one-twelfth to four-twelfths of the furnace charge, but for a very short time 50% had been used. The results from the use of concentrates in the blast furnaces had been generally successful. If not so much so as Mr. Langdon's, it was on account of the smaller proportion used. His experience had also been that the flue-dust was of very small amount, as Mr. Langdon had stated, but he thought it advantageous to moisten the ore, especially if very fine.

Dr. Raymond said that the magnetic concentrates could, in general, only be profitably prepared from waste dumps. At a former meeting he had expressed the opinion that there was no American mine where it would pay to mine and concentrate lean magnetic ore, and he was willing to stand by that statement. He would admit that he was wrong when the Croton mines have been run long enough to furnish regular working figures, and not the results of a few months only. In Mr. Hoffman's statement no account was taken of royalty on ore or increase in the expense of mining in the future. The extraordinarily low cost of mining as conducted there at present was, he thought, unusual, and by no means represented American mines in general. The small profit made there, even, proves how hard the whole thing is going to be unless everything is in its favor, and magnetic concentration will probably result profitably only at a few mines. Concerning the use of concentrates in the blast furnace, he drew a distinction between fine ore and dust. If dust such as the 6% stuff from the Ogden mines were used, there would be great loss in flue dust. He thought that the chief use of magnetic concentrates would be, made into briquettes, in the open-hearth furnace.

GOVERNMENT TIMBER TESTS, BY B. E. FERNOW, WASHINGTON, D. C.

In this paper, which was the first read at the Wednesday afternoon session, Mr. Fernow called attention to the facts that present knowledge regarding the properties of our various timbers is not very satisfactory, and that there is not much published information for general use. He described in a general way the elaborate series of tests which have been undertaken by the Government and concluded with an appeal to all men interested in the mining industry to use their influence to have made the proper appropriations for carrying on this important work. The scheme of work laid out by Mr. Fernow will result in a contribution of inestimable value to our knowledge, and it is to be hoped that Congress will be generous enough to enable him to continue it without interruption. The subject is one of vital importance to the mining industry and is becoming of more moment every year

Dr. Raymond also spoke of the lack of knowledge concerning the strength of timber, and the necessity of these tests; he commended the thoroughly scientific manner in which Mr. Fernow has undertaken the work.

TESTS AND REQUIREMENTS OF STRUCTURAL WROUGHT IRON AND STEEL; BY ALFRED E. HUNT, PITTSBURG, PA.

This paper was suggested by the appointment on the part of the American Societies of Mechanical Engineers and Civil Engineers of committees upon the subjects of "Standard Tests and Methods of Testing" and "Uniform Methods of Tests of Material used in Metallic Structures." The author referred to the frequent complaints made by manufacturers with respect to the specifications and tests prescribed by the engineer. The iron and steel manufacturers and their mill managements are more largely represented in the American Institute of Mining Engineers than either of the other societies mentioned before, and it was hoped that the presentation of this paper would lead to discussion from which a standard system of tests and methods might be developed. Mr. Hunt stated the following propositions: Specifications for tests of structural material should furnish all necessary means for excluding all material deemed unsuitable by the engineer. All testing costs money, which eventually comes out of the purchaser; hence the number of tests and the severity of their interpretation should be limited by the engineer, so far as possible, without sacrificing the principle first stated. Besides the direct increase of cost by unnecessary tests and too rigid requirements, there is another waste of money through waste of time; rarely, if ever, do the terms of the contract secure to the consumer adequate compensation for the losses by delay occasioned by the vigilance of his own agent, the inspector. Mr. Hunt then offered, from the standpoint of an extended experience as an inspector of structural material, some suggestions as to the kind and methods of tests to be adopted, their interpretation, etc.

The discussion which followed this paper was very lively indeed, being participated in by many on both sides—the inspection bureau's and the mill man's.

MR. MORRIS' CRITICISMS.

Mr. W. H. Morris, of Pottstown, asserted that the testing bureaus had worked great injustice to the mills, and criticised several points in Mr. Hunt's paper, among others the requirement that steel should not exceed a certain tensile strength. Mr. Morris also criticised the character of many of the inspectors who had been sent to the mills by the bureaus in the past. No man, said he, is qualified to be an inspector unless he has had experience as a manufacturer. He thought that the tests made by the manufacturers were full enough; those prescribed by the bureaus were too exhaustive. If all inspecting bureaus should agree upon one inspector at each works it would save time and expense, said he; often there had been as many as five or six in the Pottstown works at the same time, testing different parts of the same shipment. He suggested that engineers should accept manufacturers' tests where they have been made in the prescribed manner; surface inspection of material should be made at the mill; and a standard thickness of test pieces, as well as width, should be agreed upon.

NECESSITY OF A STANDARD CODE OF TESTS.

Mr. Kent remarked that neither Mr. Hunt nor Mr. Morris has proposed a standard set of specifications in the form of a code which could be discussed as a basis for a standard code. He thought that the tests in use at present might be too severe; the mill men should be heard, and specifications agreed upon which should be just to both manufacturers and consumers.

Mr. Oliver Williams, of Catasauqua, spoke of the greatly improved class of inspectors that was sent to the mills now in comparison with a few years ago. The great difficulty now, he thought, was that we have no settled scale of requirements. Another difficulty was that railroad companies have raised their requirements and are not willing to pay the increasd price. Specifications very nearly like those of standard bridge-makers would, in his opinion, meet the manufacturers' views. He agreed with Mr. Morris that present methods are very expensive. The general impression, however, was that the mill pays the bill, when, as a matter of fact, it always comes eventually out of the consumer.

THE PENNSYLVANIA RAILROAD'S TESTING BUREAU.

Dr. Chas. B. Dudley thought that the keynote of the whole system of inspection of any kind is that the manufacturer knows that he is going to be inspected, and knowing this will do better work. For this reason, he regarded the Pennsylvania Railroad's testing bureau, with which he was connected, as of importance from the mere fact that it existed, if nothing else. Referring to the remark made by a previous speaker concerning the increasing requirements of the railroads, Dr. Dudley stated that no specifications were ever issued from the Pennsylvania Railroad which did not have some tangible reason for every requirement. He described the method in which these specifications were prepared, and referred to a series on boiler sheets which have not yet been issued, although they had been in the office for 16 months.

In order to determine the proper requirement for these specifications, pieces were taken from 60 worn out locomotives, of which the life and work was known. Tensile and elongation tests of each piece were made, and then a careful chemical analysis of their constituents. From these data the character of the material was determined. These specifications are then sent to the purchasing agents, the manufacturers and the master mechanics of the road for criticism. The specifications which are issued are constantly revised as new knowledge is gained.

HOMOGENEITY TEST FOR BOILER IRON.

In these new boiler specifications an entirely new test, called the homogeneity test, has been introduced. It is made in the following manner. The test piece of metal is nicked on one side, put into a vise, and bent until it breaks. The fracture is then observed. It will frequently be seen that it shows numerous little holes, and the piece is rejected. The theory of this test is that it opens out any little gas bubbles in the plate, which have simply been rolled out and not welded. The importance of the test is obvious when it is reflected that these plates are to be used next the fire box, where the temperature on one side is 350° to 370° and on the other 3,000°. The heat transmitted through the plate to the water does not pass these rolled-out bubbles so easily as it does the homogeneous iron, and consequently those parts of the plate become hotter, and the bubbles expand and become blisters. Now, blisters are one of the principal causes for taking fire boxes out of service; hence the new requirement in boiler specifications.

Dr. Dudley also referred to the reason why there should be an upper tensile strength limit for steel and cited the case of the Sherman's Creek bridge on the Pennsylvania Railroad as an instance. It was desired to strengthen this bridge, which was a Howe truss, and the iron rods were taken from the first two bays and steel substituted. The steel of these rods was of excellent character; its tensile strength was 96,000 lbs. and its elongation 22%. Yet these rods broke one after another, while the iron rods in the bridge, of far less tensile strength, held as firmly as ever. The fact was, the steel rods were too strong. These rods were held up by nuts, which it proved were not exactly true; that is, the base of the nut did not make exactly an angle of 90° with the side of the rod. As a consequence there was a greater strain on one side of the rod than on the other. The steel being of high tensile strength was very stiff and would not bend, so it had to break. A soft steel of lower tensile strength would not have broken under the same circumstances. Numerous other illustrations of the same kind might be given.

INSPECTION OF COAL.

Mr. Eckley B. Coxe said that Dr. Dudley's remark about the importance of the mere existence of an inspection bureau was quite in line with his experience at the collieries of Coxe Bros. & Co. Formerly the preparation department did its own inspecting, and constant complaints were made by consumers concerning the quality of a lot of coal, perhaps five months after shipment from the colliery. Now the inspection is done by the sales department before the coal leaves the breaker. If a lot is rejected it is returned at once, and every man in the breaker, from foreman to slate picker, knows that it means more work for himself to unload that car and prepare the coal properly. As a result, complaints are never made by the consumers now.

CENTRIFUGAL VENTILATORS; BY R. VAN A. NORRIS, WILKES-BARRE, PA.

This paper had been made the special topic of discussion for the afternoon session, but after the preceding paper had been concluded there was little time left. Mr. Norris, assisted by the engineers of several collieries, has made a comprehensive series of tests of the efficiencies of various forms of centrifugal fans used in Pennsylvania collieries. His paper is too elaborate to be described in the few paragraphs to which we are limited now, but the results of his experiments will be given in a subsequent issue. The author deserves great credit for the careful and systematic manner in which he has taken up the investigation of this important subject, and although his results do not enable any definite conclusions to be drawn at present, they will serve as a basis of future investigation.

Mr. Norris' measurements show a wide range in the efficiency of the fans used in Pennsylvania, the combined efficiency of engine and fan ranging from 23% to 91.30%, although the latter figure is marked doubtful. There were three fans showing more than 85% efficiency, however, and quite a number more than 80%. The chief criticism made upon the paper was the difference in conditions under which the tests were made, the engineers of the various collieries having made them independently. It is practically impossible to carry out such experiments under absolutely identical conditions, but an absolute uniformity in the method of observation can be attained, and the personal equation eliminated to a considerable extent. Mr. H. Storrs, who has also taken up the subject, had plotted curves from Mr. Norris' data, and read a supplementary paper upon them. It is to be hoped that both Mr. Norris and Mr. Storrs will continue their study of this subject.

NOTES ON A CABLE HOIST AND THE USE OF LOCKED ROPES; BY E. GYBBON SPILSBURY, TRENTON, N. J.

Mr. Spilsbury opened the Wednesday evening session with a description of a cable tramway across the Suquehanna River, near Williamsport, erected by the Trenton Iron Company for the Glen Union Lumber Company. It was designed to transport railway cars loaded with lumber from one side of the river to the other. The span is 735 ft. Two 70-ft. towers were erected, one on each side of the river, over which were stretched two parallel cables, each 2 in. in diameter. The carriage, which is suspended from the cables, is of a size to carry one car. The latter weigh 12 tons, and 60 of them have been transported across the river in a day of ten hours. To reduce the wear on the cable and the wheels of the carriage, Elliot's smooth locked-wire rope, which has come into such general use in English collieries, was adopted. It is accomplishing the object aimed at and giving great satisfaction in consequence.

ELECTRIC LOCOMOTIVES.

The paper by Karl Eilers, Berlin, Germany, on "Electric Locomotives in German Mines," was read by title and was not discussed. Mr. H. C. Spaulding, however, gave some data concerning electric locomotives used in American mines. The Thomson-Houston Company, he said, had recently constructed the largest electric locomotive yet designed in this country. It is of 60 H. P. and weighs 21,600 lbs., or about three times the weight of the one described in Mr. Eiler's paper. It is of 3 ft. gauge, and has a maximum speed of 10 miles per hour. The armature speed is 1,020. The locomotive is 3 ft. 3½ in. high, 3 ft. 6½ in. wide and 12 ft. 6½ in. long. Mr. Spaulding also described a large electric pump designed for a 1,500-ft. lift, which under 650 lbs.-pressure showed a total efficiency of 74 %. The armature and field magnets are specially designed to be thoroughly waterproof.

THE UTILIZATION OF PUDDLE SLAG FOR PAINT STOCK; BY AXEL SAHLIN, NEW YORK.

Mr. Sahlin described the method of manufacturing paint from puddle slag and cinder at Boonton, N. J. The material is ground by means of a Cyclone pulverizer to an excessive degree of fineness. The coarsest particles of the dust would, he said, pass a 225-mesh sieve. The dust is treated with sulphuric acid, calcined, and ground a second time, when it is mixed with linseed oil, forming the stock of a very permanent paint. With a very small percentage of pigment any color can be made except white. The Cyclone pulverizer gives excellent results in grinding puddle slag to this excessive degree of fineness The grinding is done at Boonton for 17 cents per ton.

THE PREPARATION AND UTILIZATION OF SMALL SIZES OF ANTHRACITE COAL.

The great question of the day in the anthracite region—the utilization of anthracite culm—was made a special topic of discussion for the final session. Mr. Eckley B. Coxe began by stating the problem. Anthracite differs from bituminous or coking coals in that it burns only at the surface. Hence it is absolutely necessary to provide for the necessary air spaces around the pieces on the grate. This can only be accomplished by careful sizing. With coal not carefully sized the interstices between the larger particles are filled by the smaller and the air being unable to find a free enough passage combustion is imperfect. Formerly only large coal was shipped, but gradually smaller and smaller sizes were sent to market, increased attention being given to the matter of sizing at the collieries. Finally, pea and dust coal from wharfs at tidewater came into use and proved to be very good fuel. This led to more attention being given to the heaps of culm at the mines. It was discovered, however, that these were composed of quite different material from the pea and dust which had been shipped from the wharves. The latter was nearly pure coal, while with the coal in the culm banks there was mixed a considerable proportion of slate and pyrites, and the use of this material as a fuel remains to-day almost as great a problem as ever. Considerable progress has been made in the matter of sizing, however, and now far less coal goes into the culm banks than formerly. Many collieries now make two sizes of buckwheat coal, and Coxe Bros. & Co are making three.

The great difficulty is to get a suitable grate for the use of the smallest sizes of anthracite, but Mr. Coxe stated that he had already succeeded in burning $\frac{1}{16}$ in. coal. The No. 3 buckwheat made at collieries of Coxe Bros. & Co. is between $\frac{3}{16}$ in. and $\frac{3}{32}$ in. in size. It is washed on feldspar jigs, which reduce the ash to 17%. The small sizes of coal contain a much greater quantity of pyrites than the larger sizes, and jigging is therefore absolutely necessary for their preparation. With close sizing and jigging, then, Mr. Coxe thought that very small sizes of coal can be made available as fuel, but the great problem in its utilization, to-day, was to find a proper grate.

Mr. Coxe also said that it was very doubtful if the amount of culm in the anthracite region was as great as is commonly believed. The size of the piles is deceptive, and much of the culm in the old banks has deteriorated in quality so that it is no longer available as fuel in any way.

In the course of the general discussion which followed Mr. Coxe's remarks attention was called to the fact that culm was being regularly used as fuel at Scranton. Mr. Foster and Mr. Moffatt explained, however, that this was fresh culm, and on account of the conditions of mining under which it was produced was much cleaner than the culm of the banks in other parts of the anthracite region. Several members described their experience in using small sizes of anthracite, but the discussion brought out no suggestions further than those of Mr. Coxe. The meeting then adjourned.

EXCURSIONS.

Thursday opened cold and threatening, and few members anticipated much pleasure from an excursion into the Wyoming region under such circumstances. As it proved, however, all were most agreeably disappointed. At 9:30 A. M. the party took the train for Harvey Lake, Mr. Albert Lewis having invited the members of the Institute to his residence at that place. His warm welcome and the lavish entertainment which he had provided for his guests made all forget about the weather. With the reception at Mr. Lewis' house, strolls about its grounds, and voyages upon the beautiful lake, the hours were quickly passed, and when the train was again taken for Glen Summit, all were unanimous in their expressions of appreciation of Mr. Lewis' bounteous hospitality.

In the evening the members of the Institute went to Laurel Run, the domain of Gen. Paul A. Oliver, whither that gentleman had invited them to a "camp fire" on the grounds near his residence. The entertainment which he had prepared was novel indeed. The grounds had been illuminated from end to end by pine knot torches, big bonfires of pine logs and pumpkin jack-o'-lanterns, all of which had a most unique effect amid the pine trees and underbrush. A pavilion had been erected in the centre of the woods, where a bounteous supper was served, while a band, placed near-by, discoursed inspiriting music.

After supper the young people of the party indulged in dancing in the pavilion while the elder sat about the camp fire and renewed old acquaintances or strengthened new ones. Among the many interesting features of this evening was a visit to General Oliver's quaint sylvan chapel At midnight the party returned to Glen Summit, with cheers for Mr. Lewis and General Oliver, unanimous in the opinion that this had been a red-letter day of the meeting.

On Friday morning the weather cleared, and the programme of the meeting was followed by an excursion to the Lehigh region, including a visit to the breakers of Coxe Bros. & Co. at Drifton, and to the collieries, where large anthracite seams are worked by stripping off the overlying strata. Mr. Coxe entertained the party at luncheon at Onedia in his usual hospitable manner. The evening brought breaking-up time, many members returning to their homes, although quite a number remained over to visit Glen Onoko and the Switchback.

Altogether the Glen Summit meeting was one long to be remembered; every one who attended it went away with the warmest feelings toward their generous and graceful hosts of Wilkes-Barre and the anthracite region. To Mr. Eckley B. Coxe, the chairman; Irving A. Stearns, the secretary; W. A. Lathrope, the treasurer, and the other members of the local committee much credit is due for the great success of this meeting of the Institute.

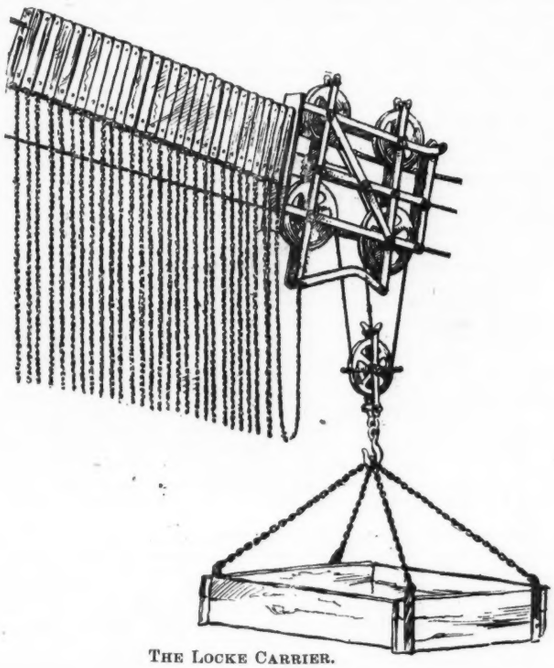
The Total Amount of Coal produced in Holland in 1889 was 54,402 tons, a somewhat smaller amount than in 1888. The only mines of importance are those at Kerkrade.

The Metallurgy of Cobalt Ores.—Dr. W. Stahl has recently patented a process for recovering cobalt from low-grade ores. His method consists in roasting the powdered ore with salt and pyrites, whereby the cobalt, and copper and manganese, if present, are converted into chlorides, while the iron is chloridized to a very small extent only. After roasting, the ore is leached with water, and the solution is treated with sulphuretted hydrogen to remove the copper. From the filtrate cobalt is precipitated with sodium sulphide. The small quantity of iron and manganese thrown down with the cobalt is dissolved from the mixed sulphides by a mixture of dilute sulphuric and hydrochloric acids.

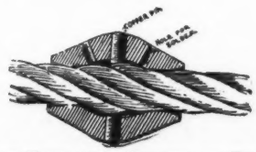
THE LIDGERWOOD SUSPENSION CABLEWAY AND THE EDISON ORE CONCENTRATING WORKS AT THE OGDEN MINES, NEW JERSEY.

On Thursday, September 24th, a representative of the ENGINEERING AND MINING JOURNAL had the good fortune to be one of a party of four that made a trip to the Ogden mines, near South Ogdensburg, Sussex County, N. J., to inspect a new suspension cableway erected there to transport rock from the mine to the Edison Concentrating Works. The other members of the party were Mr. Arnold Ruge, a German civil engineer who has come to this country with the intention of locating here permanently; Mr. H. Müller, *Koniglischer Regierungs Baumeister* (Royal Government Architect), an engineer of the German government who is making a tour of inspection of prominent engineering works; and Mr. Spencer Miller, engineer of the Lidgerwood Manufacturing Company, and patentee of the cableway.

A ride of nearly three hours from New York on the New York, Susquehanna & Western Railroad (a slow road) brought us to South Ogdensburg, where we had a tramp of a mile and a half on a country road and a climb of several hundred feet to the Ogden mine. Before describing the cableway, to see which was the chief object of our visit, a brief account of the Ogden mine and its surroundings and present condition may be given, to furnish an idea of the extent of the problem which Mr. Edison has undertaken to solve, in the solution of which problem the cableway plays an important part.



THE LOCKE CARRIER.



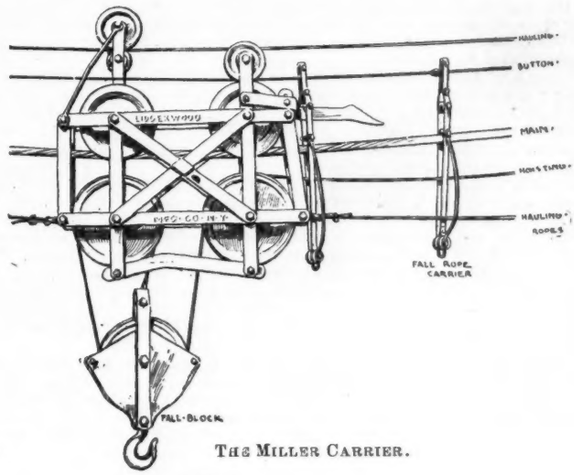
BUTTON ROPE AND SECTION OF BUTTON.

As in nearly all the iron mines in Northern New Jersey, in the Ogden mines, the magnetic ore lies in beds or lodes tilted up to a nearly vertical position, and is inclosed between hanging and foot walls of the country rock, which is generally of a foliated gneiss, composed of feldspar and quartz interspersed to a greater or less extent with grains of magnetite. The ore bodies are quite narrow, from 3 ft. to 12 ft. wide, extending a few hundred feet in length, and frequently to an unknown depth, occasionally, however, being pinched out by the coming together of the foot and hanging walls. The Ogden mines were opened probably over a hundred years ago, and were worked by slopes, drifts, tunnels, etc., by the ordinary methods of underground mining until a few years ago, when all the easily accessible high grade magnetite was removed, and the low prices of ore in the market did not justify the following of the beds to still greater depths, with consequent increase of expense for hoisting and pumping. Such a history is the characteristic one of most of the mines of the State, as is shown by the statistics published by the Geological Survey of New Jersey, the production of all the mines having declined from 932,762 tons in 1882, the highest figure reached, to 482,169 in 1889. The report of the Geological Society for 1890 contains an excellent description of the geological features of the mines and the country in which they occur, together with a complete list of the mines of the State, including those which have been abandoned.

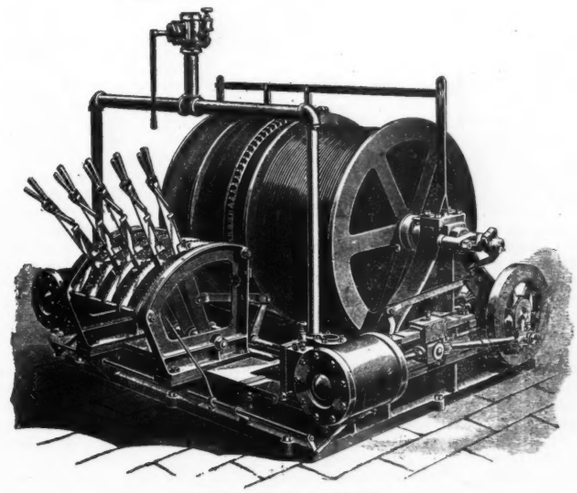
As stated in the report, the wall rock enclosing the ore bodies is well defined. There is no gradual thinning out of the ore until it becomes too lean to work, but there is an abrupt transition from the vein matter to the country rock. In many mines a smooth, greasy selvage separates the ore body from the rock.

As already stated these ore bodies are quite narrow, and of limited extent, except possibly downward (the Hurd mine having been carried over 3,600 ft. down a 30° slope). The country rock, however, is of vast extent. When this rock contains, as it usually does, grains of magnetite, it is only a question what percentage of iron is present and what it will cost to separate the magnetite from the rock, whether or not it will pay to mine it and concentrate it. At the Ogden mine, as we were informed by Mr. Edison, the rock contains on an average 16% of metallic iron, and there is in sight a mass 300 ft. wide, three miles long, and of a depth that is as yet unknown.

On our visit we were fortunate in finding Mr. Edison at the mine, and he spent several hours with us, escorting us over the ground and explaining the nature of the problem. As a purely engineering problem, considered apart from finance, it is quite simple and consists merely in quarrying out the rock in an open pit, transporting it to crushers, thence to rolls and screens, being crushed to pass through a sieve of 50 meshes to the linear inch, thence to the magnetic separators from which the separated magnetite is taken to be loaded on cars, and the residue, consisting of quartz, feldspar and phosphate of lime is taken to the dump. But when the element of finance is taken into account, and it is considered that to make a 64% ore cut of a 16% rock, four tons of rock have to be handled for every ton of product, and 1,000 tons of rock have to be quarried and treated in 10 hours, and the resulting product has to be sold in competition with 64% ores from other mines where concentration is not needed, it is seen that the problem is one requiring the expenditure of a large capital and the utmost resources of engineering skill.



THE MILLER CARRIER.



THE WINDING ENGINE.

It may be said that already most of the elements of this problem are satisfactorily solved. The quarrying is done very cheaply, the rock being soft and pliable, with the help of rock drills, dynamite and Italian labor; the conveying system is also a thorough success, so that the rock delivered at the crushers costs only 38 cts. per ton. The crushers, of the Brennan make, do the initial crushing in an entirely satisfactory manner, and the electrical part of the problem, the separation by the magnets of the grains of magnetite from the grains of refuse, is also stated to be a complete success. The intermediate portion of the problem, the fine crushing, the separation by screening of the fine particles from those incompletely crushed, their return to the crushing rolls and the conveyance of the crushed and screened grains to the magnets and thence to the cars and to the dump, has not yet been proved a success from a financial point of view, and it is to this intermediate work that Mr. Edison is now devoting his whole time and attention, living at the mine boarding house (a very different place from his mansion at Llewellyn Park), and designing, superintending and experimenting upon its manifold details. With his surpassing genius, which, as has been defined, is capacity for hard work and for taking infinite pains, it cannot be doubted that he will ultimately achieve success, and in so doing he will confer a

benefit upon the State of New Jersey and upon the iron trade of the country whose value will be inestimably great.

The work of crushing, screening and conveying is done inside of a number of large frame buildings situated in the valley a few hundred feet distant from the mine. The machinery is now undergoing reconstruction, and is not at present in operation. We had to content ourselves with an outside view of these buildings, as Mr. Edison courteously but firmly declined to exhibit the machinery to visitors until it is finished and in successful operation. He took us into the engine house, however, and showed us a four cylinder vertical triple-expansion engine of 400 H. P., which he brought from the Paris Exhibition. He is so well pleased with it that he intends to build others of the same type for other parts of the work, so as to reduce the fuel consumption to the lowest possible limit. He also described to us the difficulty of the problem with which he has to deal, and explained the presence of a vast heap of abandoned machinery, such as pulleys, sprocket wheels, conveyors, screens, etc., which had been thrown out of the mill. The abrasive action of the fine grains of magnetite and rock and the friction of the bearings had not been properly provided for, and the machinery failed by wearing itself out in a very short time. He then took us to the mine and quarry, and led the party to the top of the hill, explaining the difference between the old and the new style of mining. On the top of the hill there is one of the stations of the triangulation survey of the State of New Jersey, and the chimney of an abandoned boiler house.

While near this point Mr. Edison, in describing the old mine openings, said: "Come here, and I will show you a hole in the ground that will make your hair curl," and he led us to an opening in the ground which is supposed to be over a hundred years old. It is a frightful chasm, 8 or 10 ft. wide, about 200 ft. long, and 175 ft. deep. The hanging and foot walls slope perhaps 10° from the vertical, and are covered with a slimy, green substance. The walls are almost smooth, and there is not the sign of a prop or pillar of any kind separating them. We could not see to the bottom, but on throwing stones into the chasm we could hear the rebounding from wall to wall, and then the reverberations of a hollow, weird sound made as they fell into the water more than a hundred feet beneath. The great quarry has already cut into one of these yawning chasms, and has nearly destroyed it by cutting away its sides near the top and filling up its lower depths. The one on the top of the hill will be likewise destroyed when the quarry is extended a few hundred feet from its present position.

I come now to the description of the Lidgerwood cableways. Mr. Miller had a camera with him and took some photographs, from which the views herewith printed are reproduced, notwithstanding Mr. Edison's warning that he had a graveyard on the ground for "Kodak fiends." There are two of these cableways running from towers placed in advance of the headings, or upper benches of the quarry, to other towers placed at the chute leading to the crushers. The distance spanned by the cableway in one case is 855 ft. and in the other 1,200 ft. This latter is the largest span of any suspension cableway in existence, except a similar one at Austin, Tex., which is 1,350 ft. The shorter of the two cables is 2 in. in diameter and the larger 2¼ in.

Confining our description to the larger one, the tower at the head of the quarry is 40 ft. high and the one at the crushers, placed on an elevation 60 ft. lower, is 100 ft. high. The latter has a base 36 ft. square and resembles the tower of a railroad trestle in its construction. It is built of 12 in. × 12 in. pine timbers, braced horizontally with 3 in. × 10 in. and diagonally by 2 in. × 10 in. timbers, fastened with two ¾-in. bolts at the ends of each brace. At the head of the towers is secured an oak saddle, 20 in. × 20-in., 7 ft. long, grooved to fit the cable rope loosely, and the groove curved to an 8 ft. radius. The cable is allowed to sag about 60 ft. in the length of 1,200 ft. between the towers, and beyond them is carried down at an angle to an anchorage in the ground. The anchorage consists of an 8-in. shaft placed horizontally on top of the solid rock and held in place by two 4-in. bolts in front of it driven into holes drilled in the rock about 5 ft., which bolts also are connected by shackles placed above the horizontal shaft to two other 4-in. bolts driven into the rock a few feet behind the first two In this way the pull of the cable is resisted by the strength of four 4-in. bolts driven into the rock. To the anchorage near the 100-ft. tower the cable is adjustably attached by shackles and a large double turnbuckle, with right and left hand threads, capable of being taken up 8 ft. to compensate for any extension in the length of the cable or to vary the sag. On taking up the slack, the cable slides in the oak saddle with very little friction.

At the other anchorage the cable is attached directly by being carried around the 8-in. shaft and fastened by several screw clamps. The weight of the cable between the towers is about 12,500 lbs. The weight of ore to be transported in the "skip" is 4 tons, and the weight of the skip and the traveling carriage about ½ ton.

The peculiar advantage of the suspension cable way over the ordinary wire rope tramway with its numerous supports at short intervals, for work such as that at the Ogden mine, is that a large opening of quarry several hundred feet long with several benches at different levels, can be worked at one time, blasts being made at numerous points on all the benches at once, without any danger to the supports of the ropeway. The towers being far out of danger, there is no conveying apparatus near except the cable itself, which is far overhead The rock drills, tools and other apparatus can be loaded on the skip and taken out of danger before the blasting is done.

The means by which the skip is lowered, hoisted and traversed along the cable include a traveling carriage, consisting of a frame in which are journaled two sheave wheels to run on the cable, two similar wheels underneath them in the same frame over which the fall or hoisting rope passes, passing also around a sheave attached to the skip, making thus a three rope hoist and an "endless" or traversing rope. The fall rope is wound upon a drum of the reversing hoisting engine placed near the tall tower. The endless rope passes from the carriage to a second drum of the hoisting engine, is wrapped around it about five times, then returns the whole length of the cable to a 30-in. sheave in the opposite tower and back to the other end of the carriage. Reversing the motion of the drum causes the carriage and the skip suspended therefrom to traverse back and forth along the cable. The sheave in the short tower, around which the endless rope passes, is carried in a tension carriage, similar to that used in rope drives, which is counterweighted by a heavy weight attached to a rope in the center of the tower.

In a suspension cable way of moderate span the management of the fall and endless ropes from the hoisting drums is a matter of no great difficulty, the sag in these ropes, as they are tightened or slackened being allowed to take care of itself. In slacking the hoisting rope to lower the skip its sag becomes very great, and in a long span it would touch the ground, causing no end of inconvenience by its presence by wearing itself out on the ground, and by the delay necessary in taking in this slack before hoisting can proceed. In long-span cableways it is necessary, therefore, to provide some means by which the fall rope can be held in place parallel to the line of the cable. This is accomplished by a system of light frames of wood or iron which are known as fall rope carriers, which are strung at intervals along the cable between the skip and the tower nearest the hoisting engine.

In the earlier cableways these carriers, known as the Locke carriers, were bunched together ahead of the cable carriage when the latter was at the hoisting tower, and as it was pulled outward by the endless rope, traversing the cable it dragged the carriers and left them at intervals along the cable, the amount of the interval being determined by the distances between the points in a light chain to which the carriers were attached, and which chain was paid out from the tower as the cable carriage was carried outward. On the return of the carriage the carriers were pushed up one by one, by the carriage, and the chain between each two carriers was allowed to sag and finally form a vertical loop between them. The illustration marked "Locke carriers" shows this arrangement.

In the Miller carriers, which are now used by the Lidgerwood Manufacturing Company on all their long-span cableways, the carriers are made of a light iron framework, with pulleys on which run both the fall and the endless ropes, but the chain is dispensed with, and instead of it is used a wire rope, known as a "button rope," stretched between the towers above and parallel to the cable and provided at intervals with a number of buttons or oval balls of steel, a cross section of which is shown in cut. This button is secured by a copper pin driven through the rope, thus spreading the strands; solder is then poured in small holes filling all the interstices and leaving the button rigidly secured. These buttons are of gradually increasing sizes from a small button near the hoisting tower, to a large one near the opposite tower. The carriers are carried on a horn of the cable carriage. Each has an opening in its upper portion through which the button rope with its buttons can run. As the cable carriage moves outward all the carriers pass freely over the first button, except the last, the aperture in which is smaller than the button, and it is thereby detached from the horn and rests in its proper place on the cable. When the second button is reached, being larger, it detaches the next to the last carrier, and so on until the cable carriage has reached the extent of its run. On returning the horn on the carriage picks up the carriers as before. The illustration marked "Miller's carriers" clearly shows the improvement that has been made.

During our visit, although the concentrating mill was not running, the cableways were in operation transporting material from the quarry to be used in construction work, and they appeared to do the work required by them with the utmost facility. Mr. Edison was enthusiastic in his praise, and stated that a loaded skip of ore, weighing four tons, could be transported over the 1,200-ft. span to the crusher for less than 3½ cents per ton, including interest and depreciation.

Some of the principal dimensions of the cableway and its appurtenances are as follows: The cable is 2¼ in. in diameter; hoisting rope, ⅝ in.; traversing or endless rope, ¾ in.; button rope, ½ in. All these ropes are of crucible steel wire, with hemp center. The skip carries four tons. The hoisting engine has two cylinders, each 10 in. diameter and 12 in. stroke, and two drums, each 54 in. diameter, on the same shaft, one a wide drum for the hoisting rope, and the other a narrow drum carrying five coils of the endless rope. The engine shaft is geared to the drum shaft 1 to 4½, and both drums are connected to their shaft by friction connection and controlled by strap brakes. The hoisting and traversing drums are necessarily run at the same speed, and the speed of traverse may be anything up to 800 ft. per minute. The hoisting being done through a three-rope fall, the speed of hoisting is one-third of the traversing speed. The number of trips per hour that can be made by the skip varies with the distance traversed, which depends upon the point in the quarry at which the skip is loaded, but 15 trips have been made in an hour over an average distance of 600 ft. This is equal to 600 tons capacity in 10 hours. With two cableways the estimated working capacity is 1,000 tons in 10 hours.

An Improved Alloy for Hermetically Closing Glass Tubes and other Purposes.—It is claimed that an alloy consisting substantially of 95% of tin and 5% of copper may be used for connecting metals with glass for electrical and other purposes, hermetically sealing glass tubes, etc. The alloy is prepared by pouring the proper proportion of melted copper into the molten tin, stirring round with a wooden stirrer, casting or granulating and remelting. It adheres strongly to clean glass surfaces, and has nearly the same coefficient of expansion as glass; it melts at about 360° C. By alloying it with 0·5% to 1% of lead or zinc, it may be rendered softer or harder or more or less easily fusible as required. The alloy may also be used for coating metals or wires, as it imparts to them a silvery appearance. F. Walter, Vienna, Austria, is the inventor.

Utilization of Dorsetshire Shale.—A Scottish company has started the manufacture of a new disinfectant and deodorant, from an uncommon kind of blackstone shale found at the Dorset mines, says the *Chemist and Druggist*. Composed altogether of animal and vegetable remains, this shale is remarkably light, yet it contains oils of a very heavy and volatile character. When distilled these oils are declared to possess valuable insecticide and deodorant qualities. The shale is found at a depth ranging from 300 ft. to 500 ft. below the surface of the ground, and contains the remains of saurians and other extinct animals. The oil is extracted from the shale by distillation, and the residual product is reduced to different sizes of grain, ranging from a fine black powder to granules the size of an ordinary pea. The oil, mixed with other substances, is stated to form a manure, combining the double qualities of a good fertilizer and powerful insect killer.

BOSTON AND MONTANA CONSOLIDATED COPPER AND SILVER MINING COMPANY.

From the advance sheets of the report of this company for the year ending June 30th, 1891, we make the following abstract:

The product of matte and ore was 47,486,591 lbs., yielding 56 24%, or 26,693,842 lbs. of refined copper, from which has been realized the gross sum of $2,937,134.18; the product of silver was 285,856 ozs., which was sold for $160,039.86; total receipts, $3,097,174.04.

The costs have been: Running expenses at mine, $1,523,832 14; all other expenses of handling copper such as freight on matte, copper charges, commissions, expense account, taxes, assaying, weighing, and refining, $577,481.45; total running expenses, $2,101,313.59. This leaves a mining profit for the year of $995,860.45, which added to the balance of assets June 30th, 1890, or $1,095,029.60, makes a surplus of $2,090,890.05. From this sum is to be subtracted the following accounts: Dividends Nos. 9, 10, 11, and 12, $625,000.00; mining property bought during year, $25,000.00; construction at mine, $104,833 91; construction at Great Falls, $462,980.79; bonds bought, redeemed, and canceled, 1st issue, $94,000.00; bonds bought, redeemed, and canceled, 2d issue, $47,000.00; interest on bonded debt, premiums on bonds redeemed, and other interest, $110,359.75; total, $1,469,174 45. The balance of assets June 30th, 1891, is $621,715.60. The total cash assets are $797,217.07, the total cash liabilities $175,501.47.

The summary of operations is as follows: Ore treated, 144,705 tons; product of matte and shipping ore, 47,468,591 lbs.; product of refined copper, 26,693,842 lbs.; product of silver, 285,856 ozs.; yield of matte per cubic fathom of ground broken, 6,582 lbs.; yield of refined copper per cubic fathom of ground broken, 3,701 lbs.; yield of refined copper per ton of ore treated, 184·47 lbs.; percentage of matte in ore treated, 16·40%; percentage of refined copper in ore treated, 9·22%; cost per pound at mine, 5·71 cents; refined copper, cost per pound of refining, freight, commissions, assaying, weighing, and Boston expense, 2·16 cents; refined copper, cost per pound laid down in New York and sold, 7 87 cents.*

The under ground expense was $612,211.57, distributed as follows: East and West Colusas, $235,616.86; Moose-Auraria, $39,968.63; Mountain View, $197,960.66; Pennsylvania, $139,565.42. The smelter expense was $772,031.82 divided as follows: Heap roasting, labor, supplies, etc., $9,685.12; concentrating, labor, supplies, etc., $97,583.59; calcining, labor, supplies, etc, $149,820.23; assaying, labor, supplies, etc., $4,718.50; yard, etc., $26,101.02; smelting in reverberatory furnaces, labor, supplies, etc., $263,113.49; smelting in blast furnaces, labor, supplies, etc., $221,009.87. Additional expenses, exclusive of construction, consisting of matte and ore sacking, transportation ($59,550), taxes, office labor, etc., aggregate $139,588 75, making the total running expense as specified $1,523,832.14.

The construction account aggregates $104,833.91, distributed as follows: Moose Auraria, $122.71; Mountain View, $11,451.34; Pennsylvania, 52,827.32; East and West Colusa, $410.60; Leonard shaft plant, $72,-35.72; smelter lower works, $16,153.94; upper works, $1,332.28.

Following is given a statement of the openings and cost thereof made in the different mines, exclusive of the Leonard shaft:

	Winzes and raises.	Levels and cross-cuts.	Stoping.
Moose	377 ft. @$10.73	1,513 ft. @$5.43	233 fathoms @$29.40
M't'n View	283 ft. @ 19.23	1,494 ft. @16.12	2,654 fathoms @ 26.52
Penn.†	264 ft. @ 11.47	1,304 ft. @13.25	1 446 fathoms @ 28.83
E.& W.Colusas	455 ft. @ 15.13	1,529 ft. @ 7.97	2,879 fathoms @ 23.16

† Shaft sinking, 101·5 ft. @$22.87.

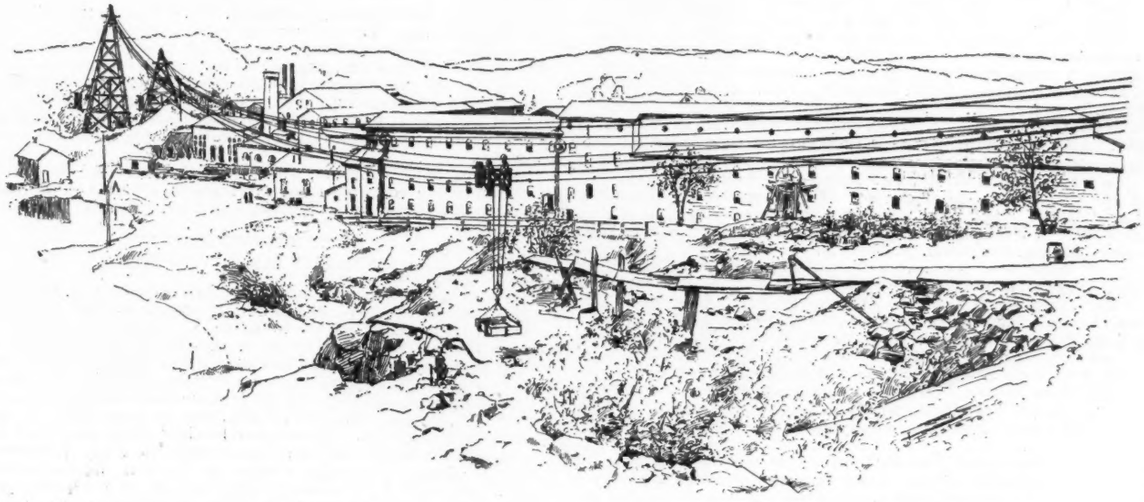
From Superintendent Couch's report we learn that the 144,705 tons of ore mined came from the different mines as follows: Moose, 3,437; Mountain View, 59,779; Pennsylvania, 32.013; East and West Colusas, 49,476. The distribution of this ore has been as follows: To the roast heaps, 18,952; concentrators, 113,477; furnaces direct, 7,815½; calciners, 3,740; yard, 502; shipped direct from mines, 218½.

Since last year's report the Leonard shaft has been sunk 488 ft. The 500-ft. level has been reached and connection made with that level of the East Colusa mine by the cross-cut. At the 200-ft. level, a cross-cut has been driven south 60 ft., and at the 400-ft. level 35 ft. Stations have been cut both the north and south sides at the 500-ft. level, from which point a cross cut will be driven south to intersect the vein cut at the 200-ft. level, and which remains, so far, unexplored. A new hoisting engine, E. P. Allis Co.'s make, 19 × 18-in. double cylinders, is in full operation. All the ores from below the 400 ft. levels of both East and West Colusas will be hoisted through this shaft. The shaft has attained the 600-ft. level and work on the stations commenced. The Colusa vein will be cross-cut as soon as expedient. The developments in the Mountain View mine at the points of intersection of the first cross-cuts from the shaft on both the 900 and 1,000 ft. levels were very satisfactory on the north vein. The intersection of the vein by the east cross-cut on the 900-ft. level was at a comparatively lean point. As developments progress, however, the improvement in value is very marked. It is estimated that there are in the mine 200,000 tons of ore above the 1,000-ft. level. It is estimated that the ore above the 500-ft. level in the East and West Colusa is 200,000 tons.

During the year the Pennsylvania mine has been developed 100 ft. in depth, making the new shaft 430 ft. The vein has been cut by cross-cuts in both the 330 and 430 ft. levels. The former level has been extended west to connect with the workings of the old shaft. The water now goes through the new level to the new shaft, thence to the surface. This connection affords an additional length of about 300 ft. of good ground in the west end. In the current year the east end of this property will be thoroughly explored. Sinking of the main shaft will shortly be resumed and another level opened. Of the 5,698 tons of silver ore mined, 3,437 tons came from the Moose mine, and the remaining 2,261 tons from the Pennsylvania mine. At the lower smelting works two new blast furnaces have replaced old ones. An additional O'Hara calciner has been built. At the upper works two new sets of water jackets will be put in. "As yet all the east ground, *i. e.*, the ground east of Meaderville, belonging to the company, remains unexplored. This ground is traversed by veins of unknown width and value. Lengthwise, nearly one half of the company's ground lies in that direction. I think a good thing for the company to do would be to explore this portion of its property by the sinking of a shaft, and cross-cutting some of the veins known to exist in it. I recommend it for your consideration," says Mr. Couch.

The construction work for the ensuing year will be the ore-bins, preparatory to the shipping of ore to the Great Falls reduction works, and the erection of the plant at the Leonard shaft, if it be concluded to sink it, and the Cornish pump plant for the same shaft. In the absence of estimates for the pumping plant, the superintendent places the amount required for surface construction during the year at $150,000. Mr. Couch concludes as follows: "It is fair to presume that the new reduction works at Great Falls will commence operations early in 1892. So far as the mines are concerned they can easily supply both works."

* It will be observed that this cost of 7·87c. per pound does not include the cost of construction which at the mine was $104,833.91, and at the new smelting plant $462,980.79, or a total of $567,814.68. This adds an additional cost of 2·127c., making a total cost of 9·997c. per pound for refined copper.



General View of Lidgerwood Suspension Cableway and Edison Ore Concentrating Works, Ogden, N. J.

Cloud Heights.—Cloud heights and velocities form the subject of a recent article in the *American Meteorological Journal*, by Mr. H. H. Clayton. The paper contains the result of cloud observations made at Mr. A. L. Rotch's observatory at Blue Hill, Mass., during the past five years. The average heights of some of the principal clouds were: Nimbus, 412 m.; cumulus, base, 1,558 m.; false cirrus, 6,500 m.; cirro-stratus, 9,652 m.; cirrus, 10,135 m. The cumulus is highest at Blue Hill during the middle of the day. The Upsala observations show that the base of the cumulus, as well as the cirrus, increases in height until evening, but neither of these conclusions apply to the observations at Blue Hill. The average velocity found for the cirrus—82 miles an hour—is twice as great as that found at Upsala. The extreme velocity was found to be 133 miles an hour. A comparison between wind and cloud velocity shows that below 500 m. the wind velocity is less than the cloud velocity. Above that, the excess of the cloud velocity increases up to 1,000 m., and then decreases again till about 1,700 m., after which it steadily increases. This decrease between 1,000 m. and 1,700 m. is very probably due to the fact that the clouds between 700 m. and 1,000 m. were mostly observed during the morning, when the cumulus moves most rapidly, and that the clouds between 1,000 m. and 1,700 m. were mostly observed during the afternoon, when the cumulus moves slowest.

THE COXHEATH COPPER MINES, CAPE BRETON, NOVA SCOTIA.

Deposits of copper ore of economic importance were first discovered on Cape Breton Island, Nova Scotia, in the Coxheath Hills, not far from Sydney, in 1881. Since that time the veins have been quite extensively opened by the Eastern Development Company, Limited, which acquired possession of them soon after their discovery, and although up to the present time not a pound of ingot copper has been produced, the company having confined itself to exploration work, the results of the latter have been of such nature that the Coxheath mines promise to become producers of considerable importance. Indeed, the engineers who have examined and reported upon the property agree that the mines are of unusual strength and magnitude.

The Coxheath mines are located upon the northern slope of the Coxheath Hills, which have a general trend in a northeasterly and southwesterly direction, the main series of copper lodes conforming more or less to this trend. These hills are composed mainly of rocks of the Laurentian series underlying the Cape Breton coal measures. About three miles north of the mines is another range of hills, known as the Boisdale, which have the same trend as the Coxheath, and are of the same geological formation. It is said that copper veins have also been discovered in these, but no work has been done in them, and if the reports of these finds are correct they are not as yet of any importance. The valley between the two ranges of hills in which occur rocks of the carboniferous series, overlying the Laurentian, is known as French Vale and extends to the northwest arm of Sydney Harbor, the latter being about 6½ miles from the Coxheath mines.

The property which has been acquired by the Eastern Development Company (which is incorporated under the laws of Nova Scotia, but is composed almost entirely of American capitalists, and has its headquarters in Boston,) is an extensive one, comprising two square miles, or 1,280 acres of Government mining leases, of which 130 acres are freehold in the Coxheath grant, and 454 in the Argyle grant. The titles are held from the Province of Nova Scotia, and are known as the "Coxheath" and "Argyle" mining leases. The former is held u der the old law by which the company is required to pay a royalty of 10 cents per ton of 2,000 lbs. of ore shipped or reduced. The royalty on the Argyle grant, which is held under the revised mining laws, is 4 cents per unit of copper contained in a ton of 2,352 lbs. of ore sold or smelted. The company also owns 15 square miles of coal rights near the Gut of Canso, Cape Breton, of which 750 acres are held in fee.

The Coxheath mines have recently been examined by Mr. Geo. Grant Francis, M. E., of London, and Mr. Pierre Humbert, Jr., M. E., of Boston, while Dr. E. D. Peters, Jr., of Boston, author of "Modern American Methods of Copper Smelting," has been engaged upon designs for smelting works, which the company is now proposing to erect. Mr. Francis states in his report that the copper veins occurring in the Coxheath and Argyle grants may be divided into two series—the main series and the "mountain" vein. The former consists of four masterly veins, designated "A," "B," "C" and "D," which run nearly parallel, and are at the surface more or less equi-distant. Their general strike is about N. 56° E., and their dip, in general, N. 75° to N. 80°.

Some of the veins, however, have a dip southerly, and it is interesting to note that vein "C" changes its dip between the 134 ft. and 184 ft. levels at No. 2 shaft, from south to north, whereas vein "B", below the 184 ft. level, has changed from north to south, making it probable that these veins will unite below the 250 ft. level. As the Coxheath veins appear underground they are undoubtedly fissure veins, in Mr. Francis' opinion, although they have not always both foot and hanging walls well defined; however, they have almost everywhere one good wall, and sometimes two The "mountain" vein is another masterly vein which has a strike of N. 11° E. and where opened a northerly dip of 80°, and probably intersects the main series.

These veins have been traced on the surface by an extensive series of open cuts, which have exposed croppings of veins in the main series for a distance of 3,558 ft. along the strike, while there is little doubt that the ground is mineralized for even greater distance. The output of the "mountain" vein has been traced several hundred feet from the south boundary line of the Coxheath grant. The outcrop of a vein in direct line with it and having the same strike has been discovered intersecting the "A" vein of the main series. If this proves to be the continuation of the "mountain" vein the known length of the latter will be 2,700 ft.

At present the main series of veins is opened by two shafts, No. 1 and No. 2, which are 1,000 ft. apart. The former has been sunk to a depth of 176 ft. in vein "A", presumably, and drifts driven east and west at a depth of 60 ft. for a distance of 170 ft., showing good ore the whole distance. This vein increased in width from 6 in. at the surface to 6 ft. at the bottom of the shaft.

The collar of No. 2 shaft, which has been sunk to a depth of 320 ft., is 120 ft. above No. 1. Through this shaft have been opened veins "A", "B," "C," and "D." Vein "A" is the most northern of the group and vein "D" the most southern, the two being about 300 ft. apart. The central veins "B" and "C" are at present depth the strongest and most promising. Vein "A" has been intersected by a cross-cut which showed 14 ft. of vein matter between walls, but no other development work has yet been done in it. Vein "B" which appears to be the mother vein of the group has been opened to a depth of 250 ft. and along its strike on the 184 ft. level for 237 ft. In this level the vein shows 10 ft. width of good ore for 180 ft., the ore body pinching in the east drift. Vein "C" has been opened to a depth of 184 ft. It has been opened on the 134 ft. level, the longest, for a distance of 267 ft., and in the estimates the average width of the lode has been placed at 3 ft. Vein "D" has been intersected by a cross-cut on the 184 ft. level, but comparatively little work has been done in it. The "mountain" vein, which is now being opened by No. 3 shaft, started on the top of the hill, about 150 ft. above the collar of No. 2, was 30 ft. wide at the surface. The shaft which is now 100 ft. deep went down in the vein for 54 ft. A cross-cut to the vein is now being driven from the bottom of the shaft.

The Coxheath veins are carried in a country rock of felsite; the vein filling or gangue is quartz ore in places approaching a porphyry, and sometimes a diorite, and is locally known as "copper rock." The ore is chalcopyrite, which is generally distributed through the whole of the gangue. The rock is estimated to carry between 4% and 5% copper. Small quantities of iron pyrites are found associated with the chalcopyrite and patches of specular iron ore, the latter in the "mountain" vein particularly. The vein matter of the "mountain" vein more nearly approaches a diorite than the so-called "copper rock" of the other veins. There is also more quartz in the gangue and the chalcopyrite is very pure. All of the Coxheath ore contains small amounts of gold and silver.

Two lots of this ore were sent to the *Société Anonyme Humboldt*, of Kalk bei Köln, Germany, for concentration tests, which demonstrated that the ore could be very successfully dressed. These samples were picked as low grade ore. The first assayed 3·46% copper. It was crushed to pass an 8 mm. sieve, and a "rendement" amounting to 18·8% of the whole, which assayed 12·65% copper, was obtained. Mr. Francis estimates that 15% of the vein stuff containing 1¼% copper can be sorted out by hand as "deads," and 10% of first class ore assaying 12% copper; and that the remaining 75%, assaying 4·2% copper can be dressed to yield a "rendement" of 22%, assaying 15% copper. The first-class ore and concentrates would, consequently, amount to 26·5% of the total, and would give an average assay of 13 85% copper.

Dr. Peters makes a very favorable report upon the smelting of this ore. In view of the cheap coal ($1.50 per ton), the low rates of wages and the silicious character of the ore, he commends the use of reverberatory furnaces and proposes to concentrate the ore up to 55% matte. On a basis of 300 tons of crude ore per day he estimates that the smelting can be performed at a cost of $2.50 per ton of material (first-class ore and concentrates) handled. The figure is low, but all conditions at Cape Breton are unusually favorable. Coal is cheap, labor is cheap and docile; the company has an excellent smelter site on deep water, whence ocean freights to Swansea are low, and the mine is so located that a railway can be built to the smelter at small cost, making the cost of transportation of ore and concentrates small; and, finally, there is an ample supply of fire-clay and limestone close at hand. With these advantages, it is estimated that 55% matte can be landed in Swansea at a cost of 7·65 cents per lb. of copper, allowing $3.00 per ton for mining expense, including dead-work, administration, etc., 40 cents per ton for dressing and 25 cents per ton for transportation of ore and concentrates from mine to smelter. Messrs. Francis, Humbert and Peters all estimate that the Coxheath mines are now able to maintain a production of at least 200 tons per day.

The Eastern Development Company, which has owned the property almost since its discovery and has expended a large amount of money on its exploration, is now making arrangements to erect smelting works according to Dr. Peters' designs, and to further develop the mines. It is proposed to erect dressing works of 300 tons per day capacity at the mines, where there is an ample supply of water, and to erect smelting works of the same capacity at some point on Sydney Harbor. The plans also include the construction of a railway 6½ miles long between the mines and tide-water.

The county of Cape Breton, wherein the Coxheath mines are located, have released the company from all taxes for a period of 25 years, and this action of the county has been legalized by an act of the Nova Scotia legislature.

IMPORTANT ARMOR-PLATE TESTS.

The most interesting and important armor-plate test, so far as this country is concerned, will take place this month at the Naval Proving Ground at Indian Head, on the Potomac. It exceeds in interest and importance the celebrated foreign armor plate trials at Annapolis in September, 1890, in that the plates this year will be the product of American foundries. Last year the results were in favor of nickel steel as against the all-steel plates, and this year the attack will be mainly on the former, although all-steel plates will be fired at, that no opportunity for practical comparison may be lost. There are to be eight plates submitted for trial, and the two companies having contracts with the Navy Department for the supply of armor, Carnegie, Phipps & Co. and the Bethlehem Iron Works, have notified the secretary that the first of the plates are ready for shipment. The plates are to be 10½ in. in thickness, and, in order that the conditions of armor may be perfectly observed, the plates will represent nickel steel of the Harvey process, all-steel of the Harvey process, and all-steel "unharveyed." The two companies have different processes of production, so that their respective methods will come up for comparison, as well as the plates themselves. The Carnegie plates are rolled, while the Bethlehem plates are forged.

In the next trial two guns are to be used, one a 6-inch 40-calibre breech-loading rifle, the other an 8-in. 35-calibre gun, and preparations have been made to strike the plates at a velocity of 2,100 ft. a second, which will be a most severe test for gun and plate. The velocity at the Annapolis trials was 2,075 ft. Brown prismatic powder from the Dupont works will be used as a charge for firing the 100-lb. Holtzer armor-piercing projectiles made in Europe. Five shots will probably be fired at each plate, as at the Annapolis trials, although that is a matter as yet undecided. The tests are planned to take place on October 15th, 20th and 25th. Delays in shipments and in setting up the plates at the proving grounds may cause a postponement of the tests, but they are confidently looked for during the month.

The Factors of Energy.—In a paper on "The Factors of Energy" in the *Journal of the Chemical Society*, Mr. W. Meyerhoffer says that any form of energy can be decomposed into two factors. For example, electrical energy = quantity × potential; energy of gases = volume × pressure. The author gives the general equation: Energy = content (*Inhalt*) × potential, and enunciates the following principle: "The energy-contents of the ultimate particles of matter are equal." He proceeds to show that nearly all known stoichiometric regularities are particular cases of this rule, and that all known methods of determining molecular weights are based on one and the same principle, namely, of finding what masses possess the same energy-content. The second law of thermo-dynamics is next discussed, and the author concludes that in its ordinary form it is untenable, there being no fundamental difference between heat and any other form of energy, the apparent distinction resting merely on the fact that we cannot attain zero-potential—the absolute zero of temperature—in the case of heat energy, while this is possible for other forms.

PROMINENT MEN IN THE MINING INDUSTRY.

Thomas Alva Edison.

No subject is attracting greater interest at the present time than the application of electricity to mining work. Already we have electric winding engines, pumps, ventilating fans, coal cutters, percussion and rotary drills and haulage systems in use in both coal and metal mines and although it is but a few years since the first of these machines was introduced, the application promises to effect a revolution in mining work in many places. Of equal interest is the application of electricity to metallurgy and industrial chemistry, which has already resulted in highly successful processes of copper refining, aluminum smelting, and the separation of gold and silver in doré bullion, besides those for the manufacture of phosphorus, potassium chlorate and others which have not yet passed out of the experimental stage. In the middle ground between mining and metallurgy, ore dressing, electricity has been very successfully applied for the concentration of magnetic iron ores, and several plants of this kind are already in successful operation at iron mines in this country.

The announcement, therefore, which was made about two years ago, that Mr. Thomas A. Edison, the most famous inventor of this electrical age, was about to enter this field, was received with much interest by mining engineers and metallurgists. Since that time, Mr. Edison has been devoting much of his attention to this line of work, but beyond the casual references in the daily press nothing definite was known concerning his work until last autumn, when it was learned that he had acquired possession of the famous old Ogden mine, in Sussex County, N. J., and proposed to concentrate its low grade magnetic ore upon an immense scale. About the same time the New York Concentrating Company, in which Mr. Edison is largely interested, is organized to reopen and work the old Sunk and Croft mines near Peekskill, N. Y. Mr. Edison is now spending a considerable portion of his time at the Ogden mines, a recent visit to which by a representative of the ENGINEERING AND MINING JOURNAL is described elsewhere in this issue, and he may be considered, therefore, to be fairly launched in the mining industry.

THOMAS ALVA EDISON.

Mr. Edison's career is so well known that more than a general outline is needless in a brief sketch of this kind. Born in Milan, O., February 11th, 1847, he was the son of Samuel Edison and Mary Elliott, the former of Dutch descent and the latter a Massachusetts woman of Scotch lineage. The family was in prosperous circumstances at the time, but meeting with misfortunes moved to Port Huron, Mich., where the father began business anew. Young Edison was then seven years old. By the time he had reached the age of 12 his quick intelligence had secured him a place as a newsboy on the Grand Trunk Railway, running between Port Huron and Detroit. He had attended school for two months only, but his mother, who was a cultivated woman, had cared that his education should not be neglected, teaching him herself. He was a voracious reader even at this early age, and his tenacious memory retained all the information that he thus acquired. As an offset to this general study to which he applied himself so closely, he became engaged in business at Port Huron, carrying on a book-store, a news-stand and vegetable market, employing eleven other boys as assistants.

In 1862 the idea of publishing a newspaper on the train occurred to young Edison, and buying a press and some old type he established the *Grand Trunk Herald*, which attained much popularity on the road. The happy idea of telegraphing ahead and bulletining the important news of the Detroit daily papers also occurred to him at about the same time. Perhaps it was this demonstration of the utility of the telegraph which attracted his attention to that subject. At all events, he commenced to study the art, and, with the assistance of a friendly operator of his acquaintance, became so proficient in five months that he was given an appointment in the telegraph office at Port Huron. From there he drifted to Memphis, then to New Orleans, Louisville and Cincinnati, working for short periods in each, studying and experimenting in chemistry and electricity always, often poor and discouraged, until finally, at the age of 21, he drifted home again to Port Huron. An appeal to a friend secured him a position in the telegraph office at Boston, and it was here that he made his first start upon the road to success. His abilities as a telegraph operator and electrician were promptly recognized, and he was even called upon to deliver a lecture upon telegraphy before an academy of young ladies. He fitted up a small workshop, in which he spent all of his spare time and put into practice many of the ideas with which his busy brain was teeming. He took out his first patent—that on a vote-recording machine—and experimented with duplex telegraphs.

From Boston, Edison went to New York, and it was not long after he had reached the latter city that an accident to the transmitting mechanism of the Law Gold indicator system gave him the opportunity needed. His skill in adjusting this apparatus won him much reputation, and secured him a position with a good salary. He immediately set out to improve the instruments in use, and before long was not only under engagement with the Gold and Stock and Western Union companies, but was under contract to give them options on all his telegraph inventions. The latter, which were speedily forthcoming, reached their climax in the method of quadruple telegraphy.

In order to carry out his arrangement with the Western Union Company, Edison started a large factory at Newark, N. J., where he employed as many as 300 men and sometimes worked upon no fewer than 45 inventions and improvements at a time. After a while, however, he found that the combined work of manufacturing and inventing overtaxed even his almost superhuman strength, and in 1876 he retired to the world famous Menlo Park where he gave himself up to his electrical investigations. Here were worked out the inventions of the phonograph, the telephone transmitter, the incandescent lamp, and the electric lighting system in all its details, which followed one another so rapidly in the four years preceding 1880.

Any one of Edison's great discoveries would entitle him to foremost rank among inventors. The system of quadruplex telegraphy revolutionized that art, and was second only in importance to the original discovery of Morse, dispensing, as it has done, with thousands of miles of poles and wires, and saving millions of dollars. Not long after he had established himself at Menlo Park he brought out his great inventions in telephony which perfected Bell's discovery. It is possible that Edison himself would have discovered the telephone had not Bell preceded him, as he had years before experimented with a system of telegraphy which would quite probably have led in this direction. Without the Edison transmitter, or, as it is now known, the Blake transmitter, Blake having made certain mechanical improvements upon it, however, it is doubtful if the telephone would have attained the practical success that it has.

Edison's greatest discovery will always be considered to have been the incandescent electric lamp, however. This had been the subject of investigation and experiment almost from the days of Faraday, and had baffled all who had taken it up. It was the key to electric lighting. Without it the latter, as applied in the arc system, would have been of comparatively little importance. One type of lamp after another had been invented by various persons, but it was not until Edison had hit upon the idea of a carbon filament of high resistance, with platinum leading-in wires, that the problem was solved. Then the subdivision of the electric current for electric lighting became possible and the key furnished for the system which plays so important a part in the economics of the present day.

Mr. Edison worked out the details of the incandescent lighting system in masterly manner. His invention of the three-wire method of distribution ranks second only to that of the incandescent lamp, and with the

feeder and main plan of wiring greatly reduced the cost of electric lighting by means of the direct current. Wherever the latter system has been adopted these methods of distribution are used. Finally, by the invention of an ingenious and accurate meter for measuring the current, the Edison system of incandescent electric lighting was completed.

Mr. Edison's marvelous invention, the phonograph, was made in 1878, being led up to by some telegraphic experiments. It was at this time, however, that his whole attention was being given to the electric light, and the phonograph was left undeveloped, a few crude instruments only being made and exhibited as curiosities. After the long years devoted to the electric light the inventor finally returned with enthusiasm to the phonograph and perfected its delicate mechanism. It is only two years since the manufacture of the latter was commenced upon an industrial scale, but they are already to be seen performing the duty of a stenographer in many offices in the large cities. Since the perfection of the phonograph, Mr. Edison's most important invention has been the magnetic ore separator, for the concentration of low grade magnetic iron ore, a plant equipped with which is now being installed at the Ogden mines. The details of the system have not yet been made public, but it has clearly passed far beyond the experimental stage. The field for work here is a broad one and success will mean much to the mining industry of New Jersey.

CRITICAL REVIEW OF EFFICIENCY TESTS OF COALS.—I.*

Written for the Engineering and Mining Journal by William Kent, M. E.

It may seem rather an unusual proceeding to review at this time the series of coal tests that were made by Prof. Walter R. Johnson nearly 50 years ago; but if any apology is needed for such a review it is found in the facts that the results of these tests are still frequently quoted by engineering writers; they find a place in the most modern text books and works of reference, and they have been accepted far and wide as of undoubted authority, but, so far as the writer is aware, they have escaped any analytical or critical review. If they had been supplanted by any more recent and better tests, or if they had fallen into oblivion, such a review would have no value; but as they still persist in modern literature, and as during the half century since they were made, there has been no attempt made either by the government or by private individuals to inaugurate any such elaborate sets of experiments as those of Professor Johnson; they are still as open to review and criticism as they were when the results were first published.

Professor Johnson's tests were made in 1842 and 1843, for the United States Navy Department, to determine the relative value for steaming purposes of the various kinds of coal that were then in the market. Thirty-five American and five foreign coals were tested. The report was published in a government document, covering 600 pages, and it shows that the tests were made with great care, the observations faithfully recorded and compiled, and every precaution taken to insure accuracy in the results which the then limited knowledge of the best methods of burning coal and of testing boilers afforded. Prof. Johnson explains in his preface the reason why the tests were made, viz.: to inform the Navy Department what class of coals should be used in its steamers to secure the greatest efficiency, and he states that the investigation must exercise a salutary influence on other branches of public defense, and be more or less felt in many important national interests. He says further, in his concluding remarks, that he cannot by any means regard the investigation of American coals as an exhausted subject, and that the coals from the great Western coal regions should be examined with no less care than the limited number of Eastern coals which he tested. If such reasons were sufficient to warrant Professor Johnson's tests in 1842, how much stronger reasons exist at the present day for a similar and more extensive investigation, when the consumption of coal in the United States is probably not less than 40 times what it was in 1842. One of the reasons, therefore, for this review is to call attention by means of Johnson's tests, and the lessons that may be learned from them, to the necessity of a new investigation, which shall determine first what are the relative values of the different classes of American coals, and second, how should each class be burned in order to obtain from it the maximum economic result of which it is capable

With this introduction by way of apology, I begin the review of the tests by some extracts from Professor Johnson's report, adding notes thereto as occasion demands. Since the extracts have been taken as needed, without reference to the consecutive order in which they are found in the report, and as frequent emendations and elisions have been made in the text, quotation marks have been omitted.

Johnson's inquiry was instituted primarily on account of the difficulty which had been experienced, and the complaints which had been made, relative to the qualities of the coals procured for the naval service. It had been found that articles furnished to the government at full prices did not answer the expectations of those concerned in their consumption. While paying the highest prices for fuel, the efficiency of the steam vessels was sometimes impaired by its inferior quality and the large amount of its impurity.

The number of samples of coal on which trials of evaporative power were made was 41. Of these, nine were anthracites from Pennsylvania.

The anthracites have specific gravities varying from 1·39 to 1·61, their mean weight per cubic foot in marketable condition being 53·5 lbs. They retain their form when exposed to a heat of ignition, and undergo no proper intumescence while parting with the small portion of volatile matter which they contain, or, if changed at all, are only disintegrated into angular fragments. Their flame is generally short, of a blue color, and consequently of little illuminating power. They are ignited with difficulty, give an intense concentrated heat, but generally become extinct while yet a considerable quantity remains unburnt on the grate.

One of the anthracite coals, that from Lykens Valley, though possessing the principal features of anthracite, also retains more than the usual amount of volatile matter, gives a considerable quantity of luminous flame, burns with more freedom than the generality of anthracites, and hence constitutes a proper link of transition to the next class, or that of the free burning or semi-bituminous coals.

Of the semi-bituminous coals, 12 samples were tested, viz.: six from the coal field near Cumberland, Md., and six from central Pennsylvania. The mean weight per cubic foot in their marketable condition is 52·844 lbs. They generally ignite readily, burn with a flame of moderate length, produce considerable intumescence, and, with but one or two exceptions, but little agglutination in coking. The form of the masses of these coals is, in some cases, partly preserved in the coke; but a rounding of the edges and enlargement of bulk clearly distinguish them from all the anthracites.

The next class of coals is that from the bituminous coal fields in the neighborhood of Richmond and Petersburg, in Virginia, of which 11 samples were examined.

The mean weight per cubic foot of all these coals was found to be 49·276 lbs. They burn with a long flame; swell considerably on being ignited; the masses cohere and form a coke, in which the original form of the coal is wholly lost. They correspond in many particulars, as in form, composition and heating power, with the foreign bituminous coals, of which six varieties were tried, viz.: one from Sidney and two from Pictou, Nova Scotia, one from Scotland, one from Liverpool and one from Newcastle, England.

Of these foreign samples, the weight per cubic foot is, on an average, 49·845 lbs., corresponding very nearly with that of the Virginia coals of the preceding class. As all these coals are found more or less extensively in the markets of our Atlantic cities, it was deemed expedient to give them a full and faithful examination, as well as all the samples sent from the different mines in the United States. Being among the most celebrated varieties of coal known abroad, they often claim the attention of American as well as other purchasers; and being of well-established character, they will serve as common terms of comparison between the American and such foreign varieties of coal as are not represented in this series.

The coals of the United States, above named, were all from the eastern slope of the Allegheny Mountains. The two following were from the western coal region or great Mississippi basin, one from Cannelton, Ind., and one from Pittsburg, Pa. The mean weight per cubic foot of these two samples was 47·23 lbs. They burn with extreme rapidity, giving a long flame, and yield a light friable coke.

On each sample of coal were made from one to six trials, according to the quantity furnished. The coal consumed in one trial never exceeded 1,567 lbs.; the average weight used for trial was 978 lbs. The trials were made during 1842 and 1843, the whole number of experiments occupying 144 days. On each day continuous observations were made during a period averaging from 12 to 14 hours.

Concerning the final results of his trials Professor Johnson writes as follows: The justly celebrated foreign bituminous coals of Newcastle, Liverpool, Pictou and Sidney, which constitute the present reliance of the great lines of Atlantic steamers, are fully equalled, or rather surpassed in strength by the analogous coals of eastern Virginia; they are decidedly surpassed by all the free-burning coals of Maryland and Pennsylvania; and an equally decided advantage in steam generating power is enjoyed by the anthracites, over the foreign coals tried, whether we consider them under equal weights or equal bulks.

Experiment appears to demonstrate that, for the purpose of rapid evaporation and for the production of illuminating gas, the coal of Indiana, though neither very heavy nor very durable, is inferior to none of the highly bituminous class to which it belongs, since in heating power and in freedom from impurity, it surpasses the splint and cannel coal of Scotland.

I cannot by any means regard the investigation of American coals as an exhausted subject.

A glance at any good geological map of the United States, in which the coal fields are laid down, will show how exceedingly limited is the whole amount of space covered by the several detached coal troughs from which the samples here presented were derived, compared with the immense extent of that formation which covers western Pennsylvania and Virginia, eastern Ohio, the eastern part of Kentucky, a part of middle Tennessee, and an undefined portion of Alabama; and much more when compared with the vast tracts of coal country in Illinois, Iowa, Missouri, Arkansas, and a considerable portion of Michigan.

To understand the relative strength and usefulness of the coals from the several parts of the three great western coal regions requires that they be examined with no less care than has been applied to the limited spaces from which were derived the materials operated on during these experiments.

The following is a condensed description of the boiler used by Professor Johnson. It was a cylindrical boiler 30 ft. in length and 3½ ft. diameter, provided with two interior flues, each 10 in. in interior diameter. The boiler was set in brickwork, by which also it was covered, and flues were arranged so as to cause the current of air and heated gases to travel in circuitous directions, thus, from the entrance under the hearth through passages in the side walls to the rear, and back under the floor of the fire flue to the front, where it passes through the grate, then above the floor of the fire-flue to the rear, where it returns through the return interior flues, thence into upper and exterior flues to the rear, and back again to the chimney. The chimney was of two parts, the lower of brick, 41 ft. high with its interior 18 in. square, and the upper part a sheet iron addition 22 ft. high and 22·9 in. diameter. The area of the lower part was 324 sq. ins., and of the upper part 412 sq. ins.

The flues were so connected with the chimney, by two dampers, an upper and a lower, that the gases of combustion could be allowed to pass through the lower damper directly to the chimney from the two interior return flues, or through the upper damper by the more circuitous route through the upper exterior flues to the rear of the boiler and back again to the chimney. In the first case the gases have a length of run from the grate to the chimney of 58·5 ft., and in the second of 121 ft. The heating surface of the boiler exposed to the current of gases when the lower damper was used was 287 sq ft., and when the upper damper was used 377·5 sq. ft. The grate area was 16·25 sq. ft, the ratio of heating surface to grate being in the first case, 17·66 to 1, and in the second 23·23 to 1. During some of the trials, the grate area was reduced, by use of an airplate bridge and coking plate, and by a row of bricks placed along the sides of the furnace, to 14·07, 11·37 and 10·29 sq. ft., and the ratio of heating to grate surface increased thereby respectively to 26·83, 33 18 and 36 68 to 1.

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The grate was at the front end 9 in., and at the back end 10 in. below the bottom of the boiler. The grate bars were ¾ in. thick, and the spaces between them ½ in. wide. When the grate was at its full size the total amount of air spaces through the grate was nearly 5¾ sq. ft.

The type of boiler, the height of grate, the proportion of air space to thickness of grate bars, and the ratio of heating to grate surface, were probably what would have been considered in the light of American practice, in Prof. Johnson's time, the best that could be adopted for such a series of experiments, but with our present knowledge of the types and proportions of boilers and furnaces best adapted to our coals, they would be considered far from correct.

The two-flue boiler has no reputation as an economical boiler; no modern engineer would set a boiler so close to the grate bars as 9 or 10 in., recent practice with bituminous coals, adopting from 24 to 42 in.; grate bars are now made with air spaces at least equal in width to the width of the bars themselves; and the ratio of heating to grate surface, instead of varying from 17·66 to 36·68, as in Professor Johnson's experiments, now generally varies from 30 to 60.

The water evaporated was supplied from a tank above the boiler, which held, when filled to its usual height, 5,110 lbs. of water. The water was measured by a rod, which was graduated, by actually weighing into the cistern successive portions of 100 lbs. of water.

The steam pressure was determined by a mercurial manometer, constructed especially for these experiments. The draught of the chimney was measured by a siphon or water gauge.

In reducing the experiments to a common standard, the latent heat of steam was taken at 1,030° F., according to Professor Johnson's own experiments several years previously. Modern authorities give the value of 966° F. Hence: Johnson's results reduced to equivalent evaporation at 212°, require to be increased by 6·61%, to compare the mwith the published results of more modern tests.

The chimney gases were analyzed, the results showing that they contained on an average 12·03%, by volume, of oxygen, or 52·5% as much as would, with the same quantities of nitrogen, have constituted atmospheric air. These experiments accord with what is stated by M. Peclet relative to those made at Vesserling in 1832, from which it appeared that the quantity of oxygen found in the smoke of the chimney of a steam boiler furnace varied from 10·5 to 11·5% while using coal, and 4·55 to 7% when burning wood. M. Peclet assumes in his calculations that one-half of the air which goes to the grate of a furnace using coal escapes unburnt.

The composition of the gases, as analyzed by Johnson, was extremely variable. Thus, the per cent. of oxygen in the gases during the trial of one of the anthracite coals, Beaver Meadow, No. 3, was in one test 13·824, and in another only 7.657. In the trial of another anthracite coal, Beaver Meadow, No. 5, one test gave 12·56% of oxygen, and another 18·11%. In the test of Midlothian bituminous coal, the oxygen varied from 7·444 to 12·73%. This variation in the analysis of the gases is an indication of the variable conditions under which the coal was burned, and may largely account for many of the anomalous results obtained in the tests.

The variability in the conditions of the firing is indicated by the following extracts from Johnson:

In the second experiment (with the Lackawanna coal) the grate was placed within 7 in. of the boiler, and the result of that trial is about 2% higher than the general average. That was, however, found too near for convenient management, and the distance of 9 in. was resumed after one or two trials. It is important that the fireman should be able to observe, especially in burning anthracite, that all parts of the grate are uniformly well covered with fuel. If large holes are allowed to exist in some parts, while heavy accumulations of coal remain on others, both may become sources of loss; the one by allowing unburnt air to pass, and the other by forming carbonic oxide, which may in part escape subsequent combustion.

With respect to the anthracites generally, it may be said that their combustion is effected solely by the contact of air with the surfaces of their solid masses. In the case of bituminous coals, on the contrary, the air which supplies combustion is inevitably intermixed during its passage through the fire with much fuel in a gaseous state. The existence, therefore, in an anthracite fire, of passages or "blowholes" through which considerable currents of air can pass without bringing every atom of it in contact with a lump of fuel, is an almost sure source of loss of useful effect. In the bituminous coal fire, the want of such openness to allow sufficient air to effect the complete combustion of the gaseous products, has given rise to the many inventions for preventing smoke, and burning more completely the gaseous products of the fuel.

It may be here remarked that Professor Johnson's theory that the combustion of anthracite is effected solely by the contact of air with the surface of the solid mass is not at all in accordance with modern theory, which holds that with an insufficient air supply the oxygen first burns a portion of the coal to carbonic acid, which gas acts upon the remainder of the coal burning it by incomplete combustion to carbonic oxide, the carbonic acid itself being reduced to carbonic oxide, at the same time, the reactions being: 1st, $C + 2O = CO$; 2d, $CO_2 + C = 2CO$.

The draught of the chimney was determined by a syphon gauge placed in the flue leading to the chimney. It showed a difference of level in the two arms of fire varying from 0·13 to 0·42 in. in different tests.

The temperature of the chimney gases varied in the different tests between 270 and 512, but generally it was kept down to very little over 300, or less than 100 over the temperature of the steam in the boiler.

The steam pressure was only 6 or 7 lbs. above the pressure of the atmosphere. The feed-water temperature varied during the eight months occupied in the tests from 40° to 88°.

When the chimney was of the original height of 41 ft. from the bottom the time occupied by the smoke in moving from the grate through the upper flue to the chimney top, the horizontal distance being 127 ft. and the vertical distance 41 ft., was 21 sec., a mean rate of 8 ft. per second, the mean draught gauge being ·237 in.

After the sheet iron addition of 22 ft. was made to the chimney it took only 13 seconds for the smoke to make the same circuit, the mean height of the draught gauge being ·405 in. The mean rate of motion of the gas was 12·66 ft. per second.

(To be Continued.)

PRODUCTION OF GRAPHITE IN THE UNITED STATES IN 1889.*

By E. W. Parker.

The production of graphite in the United States in 1889 amounted to 7,003 short tons of crude ore. This is partly estimated, as in several instances operators kept no record of the product from the mines, and could only make returns for the quantity of refined graphite obtained, with the value. In such instances the amount of crude product is estimated according to the average per cent. of yield of refined graphite per ton. A considerable portion of the graphite produced in 1889 was used in the crude state. The amount of refined graphite obtained has averaged about 400,000 lbs. each year during the past decade. It will be observed that in Pennsylvania and Michigan the expenditures are in excess of the value of the product. This fact is due to the large expense incurred in developing some of the graphite properties. These mines show promise of paying activity it the near future.

PRODUCTION OF CRUDE GRAPHITE IN 1889 BY STATES.

States.	Crude ore (Short tons).	Value.	Total expenses.	Total wages paid.	Paid contractors.	Paid for supplies.	Other expenditures.
Rhode Island	500	$10,000	$7,800	$3,800	.....	$2,500	$1,500
New York	3,460	42,410	18,370	18,370	.....	.....	.....
Pennsylvania	2,721	16,752	16,979	12,605	.....	3,754	620
Mich. and Wyo. (*a*)	322	*b*3,500	11,592	3,554	$2,285	1,480	4,273
Total	7,003	$72,662	$54,741	$38,329	$2,285	$7,734	$6,393

a Michigan and Wyoming are here grouped in order that the business of individual establishments may not be disclosed to the public. *b* Value of Michigan product only. None of that produced in Wyoming was sold.

The total number of men employed in the industry was 101. The amount of capital invested was $259,475, of which $179,800 was in land, $41,350 in buildings, machinery, etc.; $27,325 in tools, implements, live stock, etc., and $11,000 in cash.

With the single exception of the mines in New York State, the production of graphite during the past decade has been very spasmodic, and little authentic information can be obtained respecting the amount and value of the product of other localities. The product of crude graphite in 1880 amounted to 940 short tons, worth $49,800, as given in the Tenth Census reports. Those for subsequent years are returns for refined graphite made by the division of mining statistics of the Geological Survey.

PRODUCTION OF REFINED GRAPHITE FROM 1881 TO 1888

Years.	Quantity (Pounds).	Value.	Years.	Quantity (Pounds).	Value.
1881	400,000	$30,000	1885	327,883	$26,231
1882	425,000	34,000	1886	415,525	33,242
1883	575,000	46,030	1887	416,000	31,000
1884	(*a*)	.....	1888	400,000	33,000

a Practically nothing.

From the fact that the very common and useful utensils known as lead pencils are made from graphite the name of black lead has been popularly bestowed upon the mineral. Until a comparatively recent date the use of graphite has been confined to this purpose, to the manufacture of crucibles, and to various preparations for stone polishing, etc. Of late, however, other qualities have been observed, which have opened to the mineral entirely new and extensive fields of usefulness, prominent among which is its consumption as a lubricant. For the bearings of heavy machinery it makes a superior lubricant to oil, is clean, leaves no dripping grease, and one proper application will last as long as the bearings themselves. When the discovery was first made that graphite could be so utilized some difficulty was encountered in keeping the lubricant in place. As originally employed, it was mixed with oil and applied to smooth-surfaced bearings, but, though answering the purpose excellently for a while, it would creep out and escape and required constant renewals. This was obviated by the introduction of grooved bushings, the grooves being filled with a composition of 75% graphite. The box requires no refilling and the bearings need no new application until the box is worn out. Graphite bushings of this kind were first applied in 1883, and are growing in favor, being now in very general use. Graphite is also used to a considerable extent for foundry facings and washes; also as a substitute for red lead in making joints and connections, having an advantage over red lead in that it does not harden, making a perfectly tight joint that opens easily when the pipe tongs are applied. It is also said to make a good, durable paint for the covering of smokestacks, boilers, tin roofs, and other metal surfaces.

The following table shows the quantity and value of graphite imported and entered for consumption in United States from 1881 to 1889, inclusive:

GRAPHITE IMPORTED INTO THE UNITED STATES FROM 1881 TO 1889 INCLUSIVE.

Years ended.	Total.	Unmanufactured.		Manufactured (Value).	Years ended.	Total.	Unmanufactured.		Manufactured (Value).
		Quantity (Cwt.)	Value.				Quantity (Cwt.)	Value.	
1880	300,963	109,908	$278,022	$22,941	1885	207,228	110,462	$207,228	.....
1881	413,640	150,927	381,966	31,674	1887	164,111	83,365	164,111	.....
1882	389,371	150,421	363,835	25,536	1887	331,621	168,841	331,621	.....
1883	383,670	154,893	361,949	21,721					
					1888*a*	353,990	184,013	353,990	.....
1884	288,256	144,086	286,393	1,863	1889*a*	378,057	177,381	378,057	.....

a Calendar year. Others, fiscal years ending June 30.

* From Census Bulletin No. 75.

PERSONALS.

Señor Abel Bravo, a well-known civil engineer, of Panama, Republic of Colombia, is in the city.

Señor Pedro J. Sosa, the distinguished engineer, of Panama, late of the Panama Canal, is in New York.

Mr. J. W. Pinder, mining engineer, has arrived in this city from California. He will remain East for some weeks.

Dr. Edward D. Peters, Jr., the well known mining engineer and metallurgist, has gone to Colorado on professional business.

Mr. C. J. Wittenberg, of the Cresson & Clearfield Coal and Coke Company, has returned from an eight weeks' tour on the Continent.

Mr. John Stanton, prominently identified with Lake Superior copper mining interests, left for Houghton County, Mich., this week on a tour of inspection.

Hon. J. B. Grant, of Denver, ex-governor of Colorado and vice-president of the Omaha & Grant Smelting and Refining Company, was in New York this week.

Mr. W. de L. Benedict, E. M., has gone to Florida to examine phosphate properties for New York and Baltimore parties. He expects to be absent about three weeks.

Mr. P. T. Farnsworth, superintendent of the Horn Silver Mining Company, of Utah,, has been appointed general manager of the Austin Mining Company, of Austin, Nev.

Mr. Victor Manuel Braschi, mining engineer, who has been in Mexico the past 18 months traveling in the interests of the Rand Drill Company, of New York, is at present in this city.

Colonel William R. Morrison's term of service on the Interstate Commerce Commission expires in December. The President will soon need to make three appointments to that Board.

Prof. Frank H. Bigelow, formerly professor of mathematics and astronomy at Racine College, Wis., has been appointed to a post in the United States Weather Bureau, Department of Agriculture.

Mr. J. J. Hagerman, of Colorado Springs, Colo., president of the Mollie Gibson Consolidated Mining and Milling Company, passed through this city this week on his return home from Europe. The ENGINEERING AND MINING JOURNAL acknowledges a pleasant call from Mr. Hagerman.

OBITUARY.

William Harris died at Lake Linden, Mich., on the 5th inst., aged 74 years. At one time he was prominently identified with the mining interests of the Lake Superior copper mining region.

Patrick Kerby, one of the Argonauts, died suddenly in this city on the 5th inst., aged 64 years. Mr. Kerby was born in Limerick, Ireland, in the year 1827. He emigrated to this country in 1849, and during the gold excitement of that year made his way, via the Isthmus, to California. He engaged in the dry goods business there, and later became interested in mining and real estate ventures, from the returns of which he obtained considerable wealth.

Amos E. Woodward, mining engineer, died at Castle, Mont., of pneumonia on the 29th ult. During 1890 he was connected with the Geological Survey of Missouri as assistant geologist, having special charge of the subject of mineral waters. He also conducted much other work in the laboratory of the survey during his connection with it. Part of the results of his work are contained in bulletins Nos. 1 and 3 of the Geological Survey, but the greater portion remains yet to be published in volumes now in course of publication. He was a pains-taking, ambitious, and industrious worker, and made many friends during his short stay in Missouri. He resigned his position on the survey last summer to accept the post of assayer and chemist at smelting works at Castle, Mont., where he died.

INDUSTRIAL NOTES.

The Lady Ensley Coal, Iron and Railroad Company, Sheffield, Ala., blew in its Hattie furnace on the 7th inst., having completed its extensive repairs. The furnace had been out of blast since July. 8th.

Efforts are being made to organize a company to build an iron furnace in McMinn County, Tenn., to utilize the product of the McSpadden iron property, which is now being developed by J. T. Harris, of Birmingham, Ala.

The Westinghouse Air Brake Company, of Wilmerding, Pa., has put its entire plant on a reduced time schedule. The men at present are working only 7 hours per day, and five days per week, the works being shut down entirely on Saturdays.

The Pittsburg Bridge Company, Pittsburg, Pa., at a meeting of the stockholders held last week, decided to increase the capital stock of the company from $100,000 to $250,000. The business is constantly increasing, and at the present time the company is turning out more work, and has more orders on hand for future delivery than ever before in its history.

The Minerva Iron Company has leased its Minerva furnace, located at Milwaukee, Wis., to Forsyth, Hyde & Co., of Chicago, Ill., for a term of five years. About $16,000 will be spent on the repairs now being made. It is intended to "blow in" in December. The furnace's capacity will be about 700 tons per week. It will operate exclusively upon Lake Superior ores.

The Principio Furnace and Rolling Mill Company was organized on the 6th inst., at New York, with a capital of $1,000,000, and will, it is reported, erect an extensive plant at Principio, Md. The officers are: President, Robert Seaman; vice-president. Nelson E. Whittaker; treasurer, Isaac H. Carey. Directors: Robert Seaman, Nelson E. Whittaker, Isaac H. Carey, Herman C. Mechling and Henry B. Hay.

The Cincinnati Corrugating Company informs us that it is now producing terne plate at its mill at Piqua, Ohio. The black plate used in the manufacture was made from Bessemer steel billets made at Middleport, Ohio, and rolled by the Piqua Rolling Mill Company. The pig tin used in the coating came from the Temescal mines, San Bernardino County, Cal., and the lead from Missouri.

The smelter under construction at Galena, Kans., belonging to the American Smelter Company, a Chicago syndicate, with a capacity of 40 tons a day, is well under way. Contracts have been let for the necessary buildings, machinery, retorts, etc., and it is fully expected that the plant will be in operation by January 15th, 1892. The town of Galena has made valued concessions in aid of this enterprise.

The Nova Scotia Steel and Forge Company Limited, has an open-hearth steel plant and a large and well equipped rolling mill and forging establishment at New Glasgow, Nova Scotia, in which province there are now three rolling mills. So far the New Glasgow Works have run entirely on steel, but the company is now putting in a plant for rolling bar iron, and will be in this business before the close of the year.

The H. Ward Leonard Company, of New York, has published another of its novel little primers entitled, "The Value of the Services of a Consulting Electrical Engineer." The advance proof sheets of this little book are a typical product of this pioneer concern. The book comprises a series of articles on the subjects of selecting, buying and erecting electrical plants, and the necessity of having expert advice in this matter. The language is terse and pointed.

Messrs. W. H. H. Stowell, T. B. Hoover, D. T. Adams, F. I Tedford, T. H. Pressnell, and James B. Geggie have acquired the rights to the Finney patents for separating and concentrating magnetic ores for Minnesota. The syndicate has also purchased the right for Superior City, Wis. The only mill now using this patent is located at Welden, N. J., and has been running since the 1st of last March, handling an average of 90 tons of ore per day.

Howe, Brown & Co., of Pittsburg, who were mentioned a few weeks since as experimenting with crude oil as a fuel, have become convinced of its effectiveness and economy. says the *American Manufacturer*, and are now arranging all their heating furnaces to use that fuel, and probably will use it in their puddling furnaces. With the present arrangement of boiler settings the new fuel was found too expensive for steam making, but with some alterations made in this particular the oil may be used also under the boilers.

The Illinois Steel Company's new 9-in. mill, at Bay View, Wis., resumed work last week after a shut-down to permit the furnaces to be equipped with appliances for burning fuel oil, to take the place of gas, heretofore used exclusively in this department. The gas was formerly supplied through producers built especially for that purpose, but it has been demonstrated after several practical tests that on the whole fuel oil is a great advantage over coal, and it is thought the change will be permanent.

The Buckeye Engine Company, of Salem, O., has issued a new catalogue of its well-known compound tandem engines. The book is replete with illustrations of practical experiments, and in the text may be found many points in reference to steam and its economic uses. Detailed explanations are also given in this primer of tests made in which the matters of cutoff valves, condensers, etc., have been the subject of exhaustive experiment. The whole matter comprised in this book forms a useful condensed treatise on steam and its uses.

The Cowles Electric Smelting and Aluminum Company, of Lockport, N. Y., has, it is said, has been offered an order from the German Government for over $100,000 worth of pure aluminum. The Cowles Company, it is said, is not able to supply the metal in the short time required by the German Government, which wants it for the manufacture of infantry accoutrements and field machinery. The order must be filled immediately. The German Government's agent is in communication with other producers in this country to learn the extent of their plants and output, with a view of placing the order.

A new form of electric motor for street cars, it is said, has been invented by Thomas A. Edison. He has not yet made public any of the details, but says that the method of applying the current will be neither the trolley nor storage system, but that a wire will be laid beneath the rails, and the importance of the invention will consist in the fact that by its use the current may be "picked up" from the rails without danger. A model has been successfully tried on a road with a 6% grade. Mr. Edison says the new system will be from two to three times cheaper than a cable road, and will cost one-third as much as the trolley system.

On the 1st inst. there was cast in the Carnegie, Phipps & Company's Homestead Steel Works a nickel-steel ingot weighing 25 tons, which was without a flaw. It is to be reheated and rolled into a single plate for the United States Coast Defense vessel Monterey, in course of completion. This is the largest nickel-steel ingot yet made in any steel mill in the country. In a few days the works will cast one which will weigh 50 tons, designed for the same vessel, and when finished it will be 13 in. thick. One of the naval inspectors at the Homestead works says, that the Carnegie steel works are meeting with far better success in their experiments with the nickel alloy than similar works in France.

Representatives of business firms, which are among the heaviest consumers of tin plate in the country, met on the 7th inst. at the Fulton Club, in this city, and formed the "Tin Plate Consumers' Association of the United States." The officers elected were as follows: President, Henry W. Lamb, of Boston; vice-presidents, D. Willis James, Jr., and H. B. Haigh; secretary, Robert Ganz, of the *National Provisioner;* Treasurer, Charles S. Trench. These gentlemen, together with E. P. Breckenridge, John Roebeck, Stephen A. Ginna and R. Tynes Smith, constitute the board of directors. The organization is a purely business one, and was formed to protect the trade from the so-called "tin-plate lies" and to further the interests of its members along other lines.

The Wheeler Condenser & Engineering Company has recently filed articles of incorporation with the Secretary of State at Trenton, N. J. The company has bought out the entire plant and business of the Colwell Iron Works, at Carteret, N. J., which is one of the largest concerns in this country manufacturing vacuum pans and special machinery for sugar refineries, salt works, condensed milk factories, etc. The Wheeler Company will continue to manufacture Wheeler's patent surface condensers and other of his specialties. The capital stock of the company is $300,000, and the incorporators are as follows: Frederick Meriam Wheeler, of Montclair, N. J.; Aaron Vanderbilt, of New York City; Clifton H. Wheeler, of Brooklyn, N.Y.; Wm. H. Hampton, of New York City, and Chas. W. Wheeler, of Brooklyn, N. Y. The headquarters of the company will be at 92 and 94 Liberty street, New York City.

Messrs. August Belmont & Co., of New York, and Messrs. Lee, Higginson & Co., of Boston, announce that they will receive subscriptions at par for $3,000,000 7% cumulative preferred stock of the Westinghouse Electric and Manufacturing Company. The authorized capital stock of the company is $10,000,000, of which $4,000,000 is preferred stock. The balance, $1,000,000, of the preferred stock, above the amount offered now for subscription, will remain in the treasury to meet the future requirements of the business. The reorganization of the Westinghouse Electric and Manufacturing Company has been mentioned in previous issues of the ENGINEERING AND MINING JOURNAL. The company will continue to have the benefit of the mechanical and engineering ability of its founder, Mr. Westinghouse, while among the directors there are many names of high financial standing known for their conservatism and prudence. The subscription for the entire amount of the preferred stock now offered has been guaranteed by underwriters in this country.

The Aluminum Alloy Metal Company, of Hampton, Ia., has just completed its extensive plant for the manufacture of aluminum alloy metals. The plant includes a large rolling mill, and the trade will be furnished with metal, either in rolls or in flat sheets. Some of the rolls will be 60 ft. long, 20 in. wide, and others 50 ft. long and 24 in. wide. The manufacturers state that the cost of this metal will be no greater than that of first quality tin plates, while it may be used at less cost than tin, having fewer seams to be soldered. An extra quality of metal will be produced for spinning and stamping purposes at a smaller cost than that of copper or brass. This company has purchased the entire rights in this country of the W. J. Wilder patents, with one exception, that of a shop right at Yorkville, Ill. Mr. Wilder, the patentee, is superintendent at Hampton. The metal used by this concern, it is stated, is composed of zinc, tin,

and aluminum, according to Mr. Wilder's patents. No iron being used, rusting is avoided. Various tests made upon this alloy metal, according to reports, have proved satisfactory, one of the principal ones being with oil, which does not appear to sweat through, and this is, as claimed, is one of its most important features.

The Rapid Transit Commissioners have examined the plans for the rapid transit underground railroad, to be built in this city, and have announced that they have inclined to favor those submitted by Mr. W. E. Worthen. They provide for four tracks all on the same level. The roof of the tunnels to be 9 ft. below the surface of street; the height of tunnel to be 11 ft. 6 in, and the extreme width to be 44 ft. The two inner tracks to be used for express traffic, and the outer ones for local trains. The stations will be situated at convenient distances, and will necessitate passengers descending about 20 ft. below the level of the street. The stations will be between the local and the express tracks. Mr. Worthen states that the use of the system, known as "the iron poling board," will allow the construction to proceed without disturbing the surface, other than is necessary at the stations. W. Barkley Parsons submitted a set of plans which were subject to favorable comment. They prescribe the use of four tracks set in pairs, one set above the other. The two upper tracks to be used for local service and the lower tracks for express trains, with a gallery between the upper and lower tracks to accommodate all pipes and wires. It is claimed that the construction of the system would not disturb the surface. The roof of the Parsons tunnels would be less than 3 ft. below the surface of the street. Each would be 10 ft. high and 12 ft. wide in the clear. A conspicuous claim for the system is that his plans allow of a straight course without any divergence. What ultimatum will be reached by the Commission is as yet unknown.

MACHINERY AND SUPPLIES WANTED AT HOME AND ABROAD.

If any one wanting Machinery or Supplies of any kind will notify the "Engineering and Mining Journal" of what he needs, it is "Want" will be published in this column, and his address will be furnished to any one desiring to supply him.

Any one wishing to communicate with the parties whose wants are given in this column can obtain their addresses from this office.

No charge will be made for these services

We also offer our services to foreign correspondents who desire to purchase American goods, and shall be pleased to furnish them information concerning goods of any kind, and forward them catalogues and discounts of manufacturers in each line, thus enabling the purchaser to select the most suitable articles before ordering.

All these services are rendered gratuitously in the interest of our subscribers and advertisers; the proprietors of the "Engineering and Mining Journal" are not brokers or exporters, nor have they any pecuniary interest in buying or selling goods of any kind.

GOODS WANTED AT HOME

2,391. A 15-H. P. engine, a 20-H. P. boiler, a 20-in. pony planer, a small wood lathe, a reversible table with cutoff and rib-saw, and a borer and mortiser. Michigan.

2,392. A ditching machine for waterpipe ditching in a level, loamy town. Pennsylvania.

2,393. Brick machinery, full plant, lime kiln and lime-working machinery; also machinery for making lime barrels. South Carolina.

2,394. A drill called the marble valve drill, which has a marble in the valve that lets the material excavated pass up the core to the top. Texas.

2,395. A 5 or 10-ton stamp mill; must be in good condition. State particulars, present location and price. New York.

2,396. Hand drills for coal cutting. New York.

2,397. Machinery for cement works. Virginia.

2,399. A portable gold washing machine. New York.

2,400. A 40 H. P. stationary engine. Florida.

2,401. Machinery for drilling an artesian well. Texas.

2,402. A second-hand engine and boiler from 18 to 30 H. P. Georgia.

2,403. Machinery for mining phosphate. Florida.

2,404. A 60, 70 or 80 H. P. boiler; also a blower to carry off sawdust. Florida.

2,405. A windmill for pumping, a furnace for heating green houses. Alabama.

2,406. A diamond drill for prospecting. Virginia.

2,408. A 100-H. P. boiler. Tennessee.

2,409. A second-hand light locomotive. Arkansas.

2,410. Machinery for mining hard rock phosphate. Florida.

2,411. A 20 or 25-H. P. engine and boiler. Tennessee.

2,412. Dry press brick machines. Texas.

2,413. A complete 200-ton plant for working pebble phosphate, including steam shovels, dryers, separators, etc. Florida.

2,414. Machinery to operate a rich gold and silver mine. Tennessee.

AMERICAN GOODS WANTED ABROAD.

2,407. Illustrated catalogues of mining and other machinery. Brazil.

GENERAL MINING NEWS.

The output of iron ore from the Gogebic range for the season to October 1st, was 1,090,210 tons. From the Vermilion range during the same period, 724,773 tons. Of the two mines on the Menominee range reporting their outputs, the Ludington has shipped during the period specified 430,544 tons and the Hamilton 294,229 tons.

ALABAMA.

CULLMAN COUNTY.

(From our Special Correspondent.)

While digging a well a mile and a half west of Cullman, Mr. C. J. Steward discovered coal oil of good quality. It is said that a company will be formed for the purpose of developing the find.

ARIZONA.

The University of Arizona has commissioned one of its professors, now in the East, to purchase a complete outfit for the working of every kind of ore. The plant is to include a 5-stamp mill and ore dressing machinery. The machinery is now being built and some of it is already on the way. It will be in readiness about November 1st. One of the objects of the mining department of the University is to aid the miners of the Territory by experimenting with ores they may bring in, that the best method of working may be ascertained, for which no charges will be made.

CALIFORNIA.

BUTTE COUNTY.

The famous blue lead, near Bangor, says the Oroville *Mercury*, from which in early days so much gold was taken, has been again opened up. Owing to meager facilities in the past, and the depth of the channel, it was extremely hard to keep the water out sufficiently to successfully mine the same. On the land of Mrs. Bishop was an old and abandoned shaft, 70 ft. deep, which tapped the channel, which was filled with water. Lately Ben Bishop, Joseph Johnson, William Werser, and A. W. Smith erected hoisting works and put in pumps, drained the shaft, and are now taking out gold from the old river channel. Two shifts, night and day, are run, and it is said that the gravel pays at the rate of $10 per day per man.

The Oroville *Register* is encouraged at the way mining looks in this county, which has long been rich in quartz mines. The outlook for extensive quartz mining is now brighter than ever before. D. K. Perkins is opening a mine near Gravel Range, C. G. Ferguson is opening one near Enterprise, the Shakespeare ledge is being developed and a mill will be built upon it shortly. The Stow mill is being enlarged. The mill on the Golden Queen will be increased in working capacity. The Lumpkin company is developing a property that promises to be rich, and a mill sooner or later will be built. The Palo Alto company will have 10 more stamps running in a few weeks. Rich rock has been struck by Gray & Chivels, near Hurleton. The mines under Major Reynolds, near Merrimac Mills, are paying finely, while from every quarter comes cheering news of rich ore, new developments, increased milling capacity, or new mills or arrastras being put up. The improved facilities for working refractory or low-grade ores have given a wonderful stimulus to quartz mining in Butte, and to-day that branch of the industry wears a brighter and more encouraging look than ever before in the history of the State.

PERSHBAKER.—This mine will in a short time be ready for working, the water being nearly all pumped out.

NAPA COUNTY.

Messrs. Stanley & Bartlett are working a magnesite mine in the vicinity of Upper Childs Valley, 11 miles from Rutherford. The magnesite is hard, white and flinty, analyzing about 43% carbonic acid, 50% magnesia, and 7% silica, iron, lime and moisture. It occurs in ledges from 2 ft. to 6 ft. in thickness, apparently running deep, and extending upward of half a mile, as marked by heavy surface croppings. A calcining kiln of 5 tons per day capacity has been erected and is now in operation. The owners of the mine have a contract with the Willamette Pulp and Paper Company to deliver them 40 tons of calcined ore per month for two years, and delivery has been commenced. It is used at the company's works at Oregon City, Ore., in the treatment of sulphite fibre in the manufacture of wood pulp. There is quite a demand for magnesite in San Francisco, and the balance of the output of the mine, which is now about 125 tons per month, is shipped there.

GREAT WESTERN QUICKSILVER MINING COMPANY.—Superintendent Rocca is making preparations to run a tunnel 2,500 ft. in length to a point beneath that portion of the property which years ago was known as the Great Western mine, but was long since abandoned, the cinnabar, of which there were large quantities, having been removed. The tunnel will open up ground 100 ft. lower than the present deepest workings in the mine, and will afford drainage. There are reasons for believing that the tunnel will cut deposits of cinnabar before reaching the objective point. But whether it does or not, says the *Calistogan*, it will insure the continuation of work at the mine several years.

SAN BERNARDINO COUNTY.

SAN JACINTO ESTATE, LIMITED.—J. H. Crossman has leased the Gavilan gold mines from Mr. Westbrook, who holds a lease from the company. Mr. Crossman, it is said, will at once organize a company to develop the mines.

SAN DIEGO COUNTY.

Late reports from the mineral strike recently made near Elsinore are to the effect that the indications and prospects are improving with every day's work on the ledges.

SISKIYON COUNTY.

It is reported that a large amount of gold is going to Yreka from the Klamath River placer mines and the Humbug Creek quartz mines.

F. Franklin, of Greenhorn, has found a rich body of quartz on the north fork of Greenhorn, which, if proving extensive, will be one of the richest quartz claims yet discovered in this country, says the Yreka *Journal*. Mr. Franklin has been prospecting for many years on Greenhorn. This new find is in the vicinity of the claims of Ira Worden, Heckathorn & Clark, and others, in which good prospects have also been found.

BENTZ BAR.—The Chinese working this claim near Honolulu, at Klamath River, are reported to be taking out large quantities of gold dust from bottoming up the cuts opened in the old river channel. Rumor says they lately realized $21,000 in three days' run.

COLORADO.

ARAPAHOE COUNTY.

BOSTON & COLORADO SMELTING COMPANY.—This company's stockholders have authorized an increase in the capital stock of 20 per cent., or $250,000, instead of 60 per cent., as originally recommended by the directors. If more money is needed later another increase is likely to be voted, the stockholders believing that it is better to make the increase in installments than all at once. Fifty thousand dollars is wanted now for construction purposes, and a larger amount for working capital. The new stock will be sold to shareholders at par, on the basis of one share for five now held. The company paid 10 per cent. in regularly quarterly dividends, and as much more extra in the year ended with April. The company, it is said, was fortunate in its policy during the rise in silver last season. While some smelters held for a rise that never came, this company sold its product as it was made, and thus realized the advance which occurred.

GUNNISON COUNTY.

COLORADO MARBLE & MINING COMPANY.—This company has offered to donate sufficient marble to erect the Colorado state building at the World's Fair. The only conditions the company makes are that its members shall be consulted with reference to the construction of the building, so that the effect and beauty of the marble can be brought out to the best advantage, and that the State pay the railroad freight on the material from Colorado to Chicago. It is claimed that in durability, tone, color and finish the Colorado marble is equal to any that is imported from Italy.

MAY-MAZEPPA CONSOLIDATED MILLING & MINING COMPANY.—Some changes have been made at the May-Mazeppa mine. S. M. Miller resigned his position as superintendent and J. S. Olin, of Denver, has been put in charge. Dividend shaft is down 251 ft. and is showing a quantity of fine ore. As soon as the heavy machinery is in place, says the White Pine *Cone*, shipments will be commenced from this point. No. 3 shaft is down nearly 60 ft., and shows one of the largest contacts on the ground. Another 100 ft. contract will be let on Bismarck tunnel, which is being run to cut the ore chute of shaft No. 8. Work has also been resumed on Glim tunnel.

LAKE COUNTY.

MAID OF ERIN SILVER MINES, LIMITED.—Mr. Eben Smith, manager of the mines, writes to the London office as follows: "We are now following the ore on the southwest boundaries, a distance of 1,500 ft. from our present face working. We now have ore in the northwest drift in places, showing well with plenty of good ore. These two discoveries double the extent of the known ore bodies as seen by Mr. Hooper at the time he examined the properties. We have large reserves of ore lying between the known east and west boundaries. It is my object to keep the developments well in advance of the output. The carbonates, or lead ores, are looking remarkably well. The carbonate body found in the Adams has been only partially explored, and is being leisurely worked. Our sulphide contracts run to January next, and no trouble need be apprehended in renewing them on the present terms—in fact I am much in hopes of getting a reduction of $1 from the present cost of smelting after January 1st. During all the years that I have managed this property, at no time has it looked more promising than at the present. The mines, machinery, and all the business surroundings are in an extremely satisfactory condition."

OURAY COUNTY.

NEW GUSTON COMPANY, LIMITED.—The directors have declared an interim dividend of 2s. per share, and in addition a bonus of 2s. per share for the third quarter of the year, payable October 15th. A considerable balance is carried forward. The total dividends paid since November 15th, 1888, now amount to 35s. 8d. per share.

YANKEE GIRL SILVER MINES, LIMITED.—The directors of this company have just issued their report for the year ending June 30th, in which they state that the balance of revenue account, being the first year of the company's existence, amounts to £104,661 14s. 5d., after charging £10,000 to revenue account. The total dividends and bonus paid for the year amount to £104,000, or 8s. per share, representing a return of 40% upon the nominal capital of the company (£260,000) of which 2s. 6d. remains uncalled. Captain Harvey reports that the surface and underground improvements have been considerable. The total number of men employed averages 155. During the year 7,569 tons of ore were sold, which realized £158,687 9s. 9d. and, in addition, £2,964 2s. 10d. was received by way of royalties and from sales of concentrates, making a total of £161,651 12s. 7d. Mr. James K. Harvey concludes his report on the mine as follows: "The future prospects are certainly encouraging, and, with the same persistency shown in the general operations of the mine, there is every reason to believe that good results will be obtained."

SAN MIGUEL COUNTY.

SAN BERNARDO SILVER MINES, LIMITED.—The directors of this company have submitted to the shareholders their first half-yearly balance-sheet and report to June 30th, 1891. The ore sales during this period amounted to $32,075; expenses, $26,815. The first sale of ore did not take place until February 11th, the starting of the concentrating plant having been delayed by a variety of causes far beyond the time anticipated, but since then shipments of ore have been fairly regular. The accounts do not show up as favorably as might be, the five months' run with the mill having proved that, while the existing plant does its work fairly well, it is by no means as complete and as efficient as it should be. It has now been decided to rearrange and add to the machinery, in expectation of improving the quality of the concentrates and lowering the cost of working. The D. & R. G. Southern Railway, the track of which is now laid to within three miles of the mines, will, it is believed, reach the property in September, thus greatly improving the prospects of the company. Accompanying the directors' report are reports on the property by Mr. P. A. Thomas, who says the character of the ore in the San Bernardo is such that its width varies very considerably, the pay-streak sometimes narrowing to a mere knife-edge. This seems to be a marked feature, and hence he attaches very little importance to the elaborate estimates of ore in sight made by the mining experts. He, however, believes the shareholders possess a permanently valuable property, which only requires time and judicious expenditure of a portion of the working capital to become a steady dividend payer.

FLORIDA.

At a meeting of persons interested in phosphate mining in this State, held on the 1st inst., Mr. John G. Reardon said that every outside interest was combined against the miners to lower the market price of Florida phosphate. Resolutions were adopted calling for a regular convention of phosphate-mining companies, to be held at Ocala on November 19th next; also providing for the employment of an expert to canvass the State and report on the condition of mines.

GEORGIA.

LUMPKIN COUNTY.

(From our Special Correspondent.)

VICTORIA.—Mr. Messer will resume work on this property in the course of a week or two.

KANSAS.

CHEROKEE COUNTY.

During the week ending October 3d the output of ore from the mining district of Galena and Empire City was: Rough ore, pounds milled, 2,489,010; rough ore, pounds sold, 1,191,480; zinc ore, pounds sold, 786,260; lead ore, pounds sold, 129,540. Sales aggregated a total value of $11,888.

LEAVENWORTH COUNTY.

The 400 miners of the Home and Riverside coal mines, near Leavenworth, who struck for increased wages a fortnight ago (see ENGINEERING AND MINING JOURNAL for September 26th), have declared the strike off and applied for work. Nearly all of them have been reinstated.

MICHIGAN.

GOLD.

(From an Occasional Correspondent.)

ISHPEMING, Oct. 5, 1891.

At the Dead River explorations active preparations are being made for winter. A bridge has been constructed across the river at a point near the camps. The latter have been rebuilt. They were totally destroyed by forest fires during August, at the time the country was cleared of brush and made more accessible to the explorer.

At the Fire Center a building 30 ft. × 15 ft., one and a half story; another 20 ft. × 18 ft., and a blacksmith's shop have been erected. About 20 men are now in the employ of the company. During the early part of September a discovery was made of a new body of gold bearing quartz which adds materially to the value of the property. This lode runs with the formation at the contact of the (Beaver) granite with the talcoid schist, on the south. It is distant 80 ft. from the Beaver shaft, making an angle of about 20° with that vein. The general strike of the formation is about N. 70° W. of the Beaver lode, east and west. Parallel with the Beaver vein and cutting the granite are many small veins, rich in gold, some of which run into the contact. The discovery point of the south vein is at one of these junctions (a quartz vein 2 in. to 3 in. in width and rich in gold), where it is 5 ft. in width and shows much free gold in a gangue of quartz (at the surface decomposed) pyrite containing also galena and a small amount of silver. From this point the vein has been traced 150 ft. east. Lately a force was put on to explore and sink on the vein at this point. The ground has been broken to a point below the weathered portion, and shows free gold and other minerals.

At the Beaver shaft sinking has reached a depth of 50 ft.; drifting has been commenced east and west. The vein dipping west had passed out of the shaft, the latter being vertical. The drift is now in the quartz, which shows the same character and width as at the surface, carrying free gold. It is thought that the Beaver vein may cut the contact in the same manner as many of the smaller veins, and work is being done to confirm this belief.

In such an event a rich chimney of ore is looked for. The success of the last summer has been beyond the most sanguine hopes of Mr. Julius Ropes, who is superintending the work, while the prospects of the coming winter are especially flattering.

This gold bearing belt is geologically below that of the slates of the Holyoke Silver Lead mine, which was worked some thirty years ago. It is a granite belt bearing N. 70° W., and dipping at 60° S. Above this is a bed of talcoid schist. The granite is cut by numerous small quartz veins. These vary in width from less than an inch to three feet in the Beaver vein. Above the granite are alternating beds of slate, diorite and talcoid schists, and granite. Uppermost and abutting the Dead River valley, is the "Holyoke" slates. Standing above all the other ridges, forming the central core of the anticlinal, coarse, massive, tough and glaciated is a diorite ridge. Its elevation is 1,200 ft. above Lake Superior, its center about a mile from the camps. On the east slopes of the anticlinal but little has been done, although enough to show that the formation is gold bearing, and has some very promising features. There are no good roads to this section.

The Fire Center Company was organized early in September under the laws of Wisconsin, they being more favorable than those of Michigan. The company is test pitting and exploring over some 400 to 500 acres.

In the same field the Superior Gold and Silver Company holds lands which it proposes to explore.

The development of gold mining in Michigan has been slow. Local capitalists and mining men being interested entirely in iron are slow to take it up. Outside capital is shy of gold mining, especially in new and unproved ground. The work of Mr. Ropes and those interested with him during the past summer, greatly strengthens the industry, and we feel safe in predicting that gold mining will soon take its place in the list of the vast mineral resources of the Upper Peninsula of Michigan.

"L."

COPPER.

The September outputs of mineral made by the different copper producing companies were as follows:

	Tons.	Pounds.
Allouez	63	170
Atlantic	203	1,500
Calumet & Hecla	4,225	....
Centennial	78	1,000
Central	86	775
Copper Falls	*80	....
†Huron	....	....
Kearsarge	95	1,000
Franklin	201	1,000
National	*25	....
Osceola	302	500
Peninsula	120	780
Quincy	570	450
Tamarack	910	....
Wolverine	49	....
	7,040	1,175

* An estimate based upon the previous month's output. † Closed most of the month—no report.

ARNOLD MINING COMPANY.—This company's mine, says the Houghton *Gazette*, is developed by a 160-ft. shaft, recently sunk. All the rock taken out is being saved for stamping. If the present character of the lode holds the Arnold will prove a paying mine, as it is very advantageously situated for making copper cheaply.

FRANKLIN MINING COMPANY.—The Lake Superior *Democrat* publishes the following concerning this company: "The new discovery at the Franklin is deserving of more than a passing notice. It is the Allouez or Peninsula conglomerate. It passes from near the northeast corner of the quarter section owned by the company, diagonally across its land. The extent of this vein upon the property is about 2,800 ft. on the surface; the depth 5,000 ft. In cross-cutting the drift was started in the Franklin mine, at the 27th level, or 2,400 ft. from the surface. It was continued east 521 ft., when it struck the conglomerate. The face of the drift is in the lode now about 12 ft., and the showing of copper is certainly very promising. While there is the usual degree of uncertainty surrounding this discovery, as there is in all mining operations, yet at a depth of 2,400 ft. copper of the character discovered is very liable to be found in one of the regular ore chutes that are known to exist, and to continue with marked regularity. As soon as the width of the lode is determined at this point drifting operations will be commenced.

HURON MINING COMPANY.—The Houghton *Gazette* says; "We can state semi-officially that there will be an assessment of $3 per share called on an early date to pay off the debts of this company. In connection with Huron affairs we hear rumors, which we believe to be well founded, that there is a scheme on foot to consolidate the Huron with one or more of the adjacent mines and furnish sufficient capital to work the consolidated mines on a plan commensurate with their well-known value. If worked as the best of our mines are worked to-day, we are more fully convinced if the scheme is carried through it will prove to be a paying investment."

The Huron Mining Company's property is covered with attachments aggregating in round numbers $70,000. Its capital stock is 40,000 shares, which are now selling at 70c. per share, or a total of $28,000. The mine was and is now reported to be operated at a decided loss. An assessment of $3 per share would, if all collected—and we are of the opinion that this would be extremely difficult—realize to the company $120,000. This sum, after paying debts, would leave less than $50,000 for the replacement of the present equipment, which is in the last stages of its usefulness, and the systematic development of a mineral belt that has not been worked with a view to the future.

It is very laudable to pay one's debts—a $3 assessment will do this. However, there are numerous stockholders who would doubtless prefer to see the property under a different management before they again put their hands into their pockets. This same class does not see the benefit to be derived by paying into the treasury a sum which will not much more than discharge those debts incurred, while the mine was being worked without profit. Nor has the property been put in any better condition than it was in May, 1887, when a $3 assessment was called. At that time, it will be remembered, great things were promised.

The idea of consolidating the property with the Sheldon & Columbia, W. C. Royale and Grand Prize mines, which adjoin, is an excellent one, but we will venture the prediction that Mr. Daniel E. Dennison and his followers will not be in control when it is done.

PENINSULA MINING COMPANY.—This company's September output of 120 tons 780 lbs. of mineral is the largest in the history of the mine. The property, we understand, is on the market.

TAMARACK, JR., MINING COMPANY.—Superintendent Daniell, of this company, writes to the eastern office, under date of the 30th ult., as follows: "The plat at the third level, No. 1 shaft, is finished. The third level cross-cut has been drifted 85 ft. during the month and is in 148 ft. There will remain about 18 ft. to stope. The winze under the second level was sunk 75 ft. for the month down to the third level. We have drifted north from the bottom of the winze 9 ft. Both winze and drift show rich ground. The lode is 9 ft. wide. The second level north has been drifted 44 ft. Here we have had a good improvement. The lode for the last 30 ft. drifted showed good stoping ground. There is every prospect of this continuing. No. 2 shaft was sunk 70 ft. during September.

It is said that the company will be in shape to treat stamp rock by November 1st.

The second assessment of $3 per share levied June 10th, 1891, upon the capital stock of the company is payable at the office of the company in Boston November 5th, 1891, with interest thereafter at the rate of 6% per annum, by stockholders of record, at the close of business October 17th, 1891.

TECUMSEH MINING COMPANY.—For two weeks a diamond drill has been at work on the Kearsarge amygdaloid, on this company's property, says the Calumet *News*, but although holes have been bored in all directions, both in the lode and crosswise, nothing of any importance has been discovered, although the core taken from the hole bored in the lode to the south shows a little copper. Four lodes from 6 to 18 or 20 ft. wide have been encountered, and if, as is supposed, they form a junction below, there is every reason to believe that they will make copper as depth is attained. After this month it is probable that the management will stop the work on the Kearsarge lode, and direct its attention to sinking the new shaft on the Osceola lode.

WENDIGO COPPER COMPANY.—At this company's property on Isle Royale two drills are in use and three holes, two 700 ft. and the third 500 ft. have been bored. Indications of the rocks passed through point very strongly to copper. The work

is merely exploratory and is carried on by the company in order to thoroughly acquaint itself with the nature of the rocks.

IRON—GOGEBIC RANGE.

GENEVA.—While recently exploring in an old tunnel of this mine, a chimney of ore was struck near the surface. Further work developed the knowledge of the existence of a body of ore. It is probable that the mine will be re-opened and wrought.

MINNEWAWA—PENCE.—The pumps at these mines have been taken up and the properties are now idle. The Hurly *Tribune* hints that there is a game of freeze out going on in connection with these properties, and laments the fact that two good mines should stand idle in consequence thereof.

SUPERIOR MINING COMPANY.—This company's mine is to be unwatered and worked at an early day.

IRON—MENOMINEE RANGE.

The *Diamond Drill* publishes the following table showing the output of the Crystal Falls district during the season to date and for the corresponding period in 1890:

Mine.	1890.	1891.
Armenia	22,000	.....
Dunn	105,000	126,000
Great Western	59,000	50,000
Mastodon	53,500	30,000
So. Mastodon	1,000	.....
Monitor	15,000	45,000
Paint River	43,000	40,000
Shafer	38,000	50,000
Youngstown	32,000	.....
Mansfield	8,000	40,000
Hemlock	.....	25,000
Total	376,000	406,000

The entire output of 1890 was 537,769 tons. There is a month and possibly six weeks remaining of the season, and it is probable that the 1891 output will equal that of 1890.

ARAGON MINING COMPANY.—This company has shipped this season 40,000 tons of ore and has 4,000 tons in stock at the mine. No. 2 or new shaft has reached the sixth level and the plat is being cut. The company expects to ship to Chicago by rail during the winter. The mine, it is said, is in good condition as regards ground opened, and is one of the solid institutions of the Menominee range.

LINCOLN.—This mine will be in the ore market next year, it having passed through the exploration stage. In the north cross-cut clean ore 15 ft. wide is shown. The vein was drifted 60 ft. west in the ore and again cross-cut, proving an increased width of 25 ft.

LOTTIE MINING COMPANY.—There is, according to the Crystal Falls *Diamond Drill*, a probability that this company's property will change hands shortly. At present negotiations are hindered by a difference of opinion as to whom the option rightfully belongs. The mine was operated last winter by a company of Crystall Falls gentlemen and incorporated in the name of the "Iron County Mining Company" and later changed to the "Lottie Mining Company." It is situated in the south half of the northwest quarter of section thirty-three, 44-31, on the south bank of the Michigamme river. The parties negotiating are represented by Mr. D. T. Adams, of Duluth, Minn. Numerous shallow pits have been put down and some very fine blue ore taken out, but it has not been found in place. Mr. Adams is well pleased with the outlook, and is of the opinion that deep work will show up a fine vein of ore, which, if it maintains the character of that so far unearthed will be a Bessemer, and is anxious to take hold of the prospect. The formation shown differs radically from anything heretofore discovered on the Menominee range, or in the Lake Superior basin. It has a northeast and southwest trend; some sandstone and quartzite is shown but the dominant rock is limestone, which will form both walls of the ore if it is found in place. The dip of the formation is about 35°. This formation compares with that of the Southern iron fields.

MILLIE MINING COMPANY.—This company has finished its season's shipments; the same have aggregated 5,000 tons. The Norway *Current* says that Capt. John Carbis will sever his connection with the mine, and Superintendent McGregor will give his personal attention to the mining work during the winter.

PAINT RIVER MINING COMPANY.—This company is preparing to do exploratory work at its mine. It has sent out 40,000 tons of ore this season and is moving 400 tons per day on an average. The stock pile, it is stated, contains 7,000 tons.

STONE.

PORTAGE ENTRY SANDSTONE ASSOCIATION.—This company, having its seat of operations in Houghton County, Mich., has been formed with a capital stock of $1,000,000 in shares of $25 each. The cash value of the real estate conveyed to the company is $50,000. The names of the stockholders and directors are: Norbert Sarrazin, Joseph Croze, Prosper Roberts, Philip B. Parker and Nathan F. Leopold. The quarry is located on Sec. 31, town 54, range 32. Extensive stripping and facing is being executed. The deposit, which is a red building stone, is said to be an excellent one.

MISSOURI.

JASPER COUNTY.

(From our Special Correspondent.)

JOPLIN, Oct. 5.

The lead and zinc mines of the entire district made a large output during the past week. The sale of ore maintained an average. The zinc ore market remained in about the same condition as during the previous week at an average price of $22.50 per ton. Lead ore advanced to $25.75 per thousand. The most important feature of the zinc ore market was an order for 500 tons from Bristol, England. Following are the sales from the different districts:

Joplin mines, 1,564,470 lbs. zinc ore and 207,750 lead; value, $22,950.

Webb City mines, 1,254,610 lbs. zinc ore and 71,020 lead; value, $15,943.

Carterville mines, 1,895,890 lbs. zinc ore and 132,440 lead; value, $25,210.

Zincite mines, 173,770 lbs. zinc ore; value, $2,127.

Lehigh mines, 43,000 lbs. zinc ore; value, $630.

Oronogo mines, 46,810 lbs. zinc ore and 19,770 lead; value, $998.

Carthage mines, 326,000 lbs. zinc ore; value, $3,911.75.

Galena (Kan.) mines, 786,260 lbs. zinc ore and 129,540 lead; value, $11,888.

Districts, total value, $83,657.75.

Aurora (Lawrence County) mines, 220,000 pounds zinc ore, 340,000 silicate and 245,000 lead; value, $10,670.

Lead and zinc belts, total value, $94,327.75.

GRETCHEN LEAD AND ZINC COMPANY.—This company at Stevensville, three miles west of Joplin, has now started up. It was closed some time ago for repairs.

REX MINING AND SMELTING COMPANY.—A strike has been made on the 1,000 acre tract of land recently purchased by this company.

EMPIRE ZINC COMPANY.—This company has made a strike of the finest zinc that has yet been found in the district. Large and small boulders were taken out for specimens, and were completely crystallized; they presented a blue-black satin finish.

WHITE ELEPHANT.—This mine shipped a carload of high grade zinc ore last week.

The most important strike of the Lehigh camp was made last week on the A. Knight land by drift at the depth of 120 ft. The ore now indicates the possibility of opening up of a very large body of the rich free crystallized ore peculiar to this district. The tract of land contains 343 acres, and has been prospected at different points by drilling to a depth of 200 ft. In one drill hole the cuttings showed zinc ore from 110 ft. to 201 ft. Another hole near the center of the land showed lead at 126 ft. and zinc ore at from 130 to 173 ft.; still another hole passed through 55 ft. of zinc ore. The owner, Mr. Augustus Knight, of St. Louis, is having the present development work done under the supervision of Mr. S. A. Stuckey, of Carl Junction, who has put in a good plant of machinery.

The past mining in the Lehigh district has been confined almost entirely to the bank along Center Creek, from which it was believed by many that the ore bodies did not extend to the north for any great distance, consequently this late development proves that the ore body one-half mile north of Center Creek was formed at a greater depth than along the creek.

MONTANA.

ANACONDA MINING COMPANY.—This company has filed its annual statement as required by law. It is as follows: Anaconda Mining Company, a corporation formed under the laws of the State of Montana. It is hereby stated that the capital stock of said company is $12,500,000, and that the same is actually paid in, and that the existing debt or debts of said company now outstanding is $5,000,000, the same being mortgage bonds paid as part of the purchase money of the property of said company. Signed, J. B. Haggin, president; J. F. Heyward and R. P. Lounsbery, trustees.

BOSTON & MONTANA CONSOLIDATED COPPER AND SILVER MINING COMPANY.—The product of this company for September was 2,450,000 lbs. of refined copper.

BUTTE MINING AND MILLING COMPANY.—This company has been organized to operate in Silver Bow County, and in the vicinity of the Katie J. O'Brien mine and mill in Jefferson County. The capital stock is $250,000. E. E. Congdon, J. W. Reed, William Hazelton, William Winters and F. T. McBride are the incorporators.

DEER LODGE COUNTY.

COMBINATION MINING AND MILLING COMPANY.—According to the annual statement filed by A. H. Barret, the vice-president, the capital stock is $600,000, all actually paid in in money or in real or personal property. The assets of the company consist of a group of 25 quartz claims and mill sites. A 10-stamp mill, with an additional 10-stamps nearly completed, roaster with roasting capacity for 20 stamps, ore bins and other buildings, two shaft houses and hoisting engines, diamond drill plant, pumps, tanks, trucks, cars, etc.; moneys due from shipments made and ore on hand from which there have been no returns, $24,250, and the proceeds of assessments No. 3, three cents per share, $9,000. The liabilities consist of an overdraft of $33,828.15, together with interest and exchange charges, and the ordinary mining expenses.

ELIZABETH MINING COMPANY.—The latest report from this property says that after advancing 4 ft. in rich ore the vein widened to 10 in. and extended to the roof of the tunnel. The assay across the face of the streak at this point averaged 84 ounces in silver. In order to make faster progress Superintendent Dodds discontinued breaking ore and drove alongside of it. The quartz appeared solid for 16 ft., when it was found broken up; it appears to be coming in solid again. A side shot about 5 ft. back from the face of the drift showed streaks and bunches of pay ore mixed with granite, 2 ft. in width. The footwall is wet and very much decomposed. There are 3 ft. of hard granite between the footwall and the granite mentioned. Since the big strike was made the drift has been run 73 ft., and most of this distance has been in pay ore from 6 to 10 in. wide.

SULLIVAN & WILSON.—This group of mines, near New Chicago, has been sold by J. H. Leggatt & Co., of Butte, to Colby, Hoyt & Co., for $200,000, it is said.

JEFFERSON COUNTY.

HIAWATHA MINING COMPANY.—The contract has been given to Messrs. Egan and Sanders to sink the shaft of the Hiawatha mine, Basin district, 200 ft., taking it down to the 500-ft. level. Work has already been begun.

WILBUR.—Mr. A. P. Smith has taken a lease and bond for $30,000 on this mine in the Amazon district, owned by Mr. Geo. Spencer. Drifting is now going on and ore is being taken out. The property is said to be looking well.

MEAGHER COUNTY.

The ore bodies of the Castle district, says the Castle *Tribune*, are usually found at or near the surface, covered with an iron cap, which is non-mineral bearing. Immediately underlying this crust occurs the ore. It is composed of carbonate of lead, containing a small amount of lead sulphate. It is also mixed with varying amounts of silica and oxide of iron. This ore maintains its oxidized character to an unusual depth. It is found in the Cumberland at a depth of 500 ft. which are the deepest workings in the district. The veins of the Castle district are generally found lying between a lime and porphyry formation. The ore occurs in chutes in the veins. In the Cumberland, the mineral is found in lime. There are portions of the district in which the mineral is found in a contact lying between granite and porpyry, as on the Princess hill. On the Four Mile the lodes are mostly true fissures in a granite formation.

FLORENCE.—This mine lies parallel with, and 600 ft. west of, the Queen of the Hills. Its manager is George L. Johnston, and from him the Helena *Journal* received the following information: The mine has shipped 6 carloads of ore to Great Falls that assayed 76 oz. silver per ton, and is now working 6 men. The developement consist of one tunnel 425 ft. long, and another 100 ft. above the first 350 ft. long; a winze in the lower tunnel was sunk to the depth of 65 ft., where water stopped operations, which will be resumed as soon as the railroad can bring the necessary hoisting machinery to the ground. The mouth of the tunnel is within 50 ft. of the main track. There are 5 carloads of ore on the dump, and the mine can produce 2 carloads per week. It has paid expenses for the year past. The owners will push the improvements. The present cost of getting a ton of ore to Great Falls is $8.

ONTARIO MINING COMPANY.—This company, of White Sulphur Springs, has let a contract for a 400-ft. tunnel on its property in the Barker district. The property is developed by a shaft 100 ft. in depth, from which was extracted $3,500 worth of ore, not including second class ore. At that depth work was interrupted by water. The tunnel will be run on the lead and will be about 250 ft. deep.

QUEEN OF THE HILLS MINING COMPANY.—The developments at this company's property up to date are: A tunnel running on the vein a distance of 930 ft., with 300 ft. of upraises; an intermediate tunnel running into the mountain 100 ft. above the main tunnel a distance of 300 ft.; dimensions of the main tunnel are 4 x 6½ in the clear, with ore chute and ladderways every 50 ft. Outside improvements consist of blacksmith and carpenter shops, men's changing room, assay office, and ore bins. From Nene Curvin, the foreman, the Helena *Journal* learns that 35 or 40 carloads of ore have already been shipped, and there are 3,000 tons of ore on the dump, worth $30 to $40 per ton. The mine is working 12 men, and will soon increase the number.

MISSOULA COUNTY.

GOLD GROUP GRAVEL AND QUARTZ MINING COMPANY.—This company has been incorporated to work the Missoula Gold Thread and Oro claims. The incorporators are: L. Kerrick, W. S. Harris, Frank Knox, J. W. Smith, G. W. Foster, of Salt Lake; E. H. Cooper, of Demersville, Mont., and Edward Roteh, of Austin, Nev. The capital stock is $2,500,000, shares $10 each.

SILVER BOW COUNTY.

BLUE BIRD MINING COMPANY.—An explosion of six boxes of giant powder occurred at the Ground Squirrel claim where this company has been sinking a shaft. Several houses were completely destroyed and many persons were injured.

BUTTE & BOSTON MINING COMPANY.—A letter from Supt. Palmer, of this company, under recent date, says that the east Gray Rock is looking well on the 800 ft. level. The Silver Bow looks fairly good on the 600 ft. level west. The No. 2 Silver Bow, east vein, is 10 ft. wide and carrying nice copper, averaging 8%. Mr. Palmer says that he has started the No. 7 O'Hara furnace and finds it works well. The No. 8 he expected to start last Saturday. Mr. Palmer has improved some of the furnaces by adding two plows, making four in each, and he writes that they do almost double the work of the old. With the two new furnaces going the remainder of the O'Hara furnaces are to be equipped with four plows, thus giving a surplus of calcining capacity. Within two months it is expected that the company will be producing 950 tons of copper matte per month.

SOCIETE ANONYME DES MINES DE LEXINGTON.—This company's annual report states that the amount of the capital stock is 12,000,000 francs, of which 2,500,000 francs were actually paid in the remaining 9,500,000 francs is represented by the Lexington mining property and the old Telegraph mine and smelter of Utah. The assets of the corporation are 20,000,000 francs, and consist of the Lexington, Wild Cat, Atlantic and Alice Brown and part of the Walpole and Chinook lode mining claims, the Allie Brown mill site, the new Lexington quartz mill, buildings and improvements all situated in Summit Valley district, and the old Telegraph mines and smelters situated in Utah, and the sum of 1,200,000 francs; the actual cash value of the assets is estimated at 7,500,000 francs. The corporation has no liabilities except its ordinary operating expenses.

NEVADA.

EUREKA COUNTY.

EUREKA CONSOLIDATED MINING COMPANY.—As prophesied in our last issue the reduction works of this company at Eureka have been closed down for an indefinite period. Prospecting work will continue in the mine.

STOREY COUNTY—COMSTOCK LODE.

According to the Virginia *Enterprise*, the water in the Carson river has risen, and the Eureka mill is running 10 of its 60 stamps, and four pans on Consolidated California & Virginia ore, in addition to the Morgan mill, which is running 44 stamps.

COMSTOCK TUNNEL COMPANY.—From the report of this company for the fiscal year ending August 31st, 1891, we learn that the outstanding bonded indebtedness is $1,908,000. During the year to that date obligations were discharged as follows: On March 1st, 1891, bonds of the face value of $231,000 were purchased at a cost of $89,433; interest coupons Nos. 1, 2 and 3 were met at a cost of $123,720. Notice has also been given of the company's intention to meet on November 1st, 1891, interest coupon No. 4 of $38,160. The operating expenses amounted to $59,667.20, against $71,799.68 for the eleven months covered by the last annual report.

Concerning the litigation with the Sutro Tunnel Company, time and again referred to in these columns, the report states that a court decision will probably be had before August 1, 1892.

A portion of the report speaks of the new contracts for royalty with the mining companies. This was fully set forth in the ENGINEERING AND MINING JOURNAL, February 28 and March 14, 1891.

The balance sheet is as follows:

ASSETS.

Property	$6,139,000.00
Cash in Treasury	102,516.41
" " Nevada	1,178.61
Unadjusted accounts	47,169.31
Balance of cash advanced by Mining Companies when the Tunnel was built:	
Main Tunnel	19,497.36
North Lateral Tunnel	139,645.97
South " "	174,580.10
	$6,623,587.76

LIABILITIES.

Shares	$4,000,000.00
Bonds	1,908,000.00
Contingent liability to Mining Companies for cash advanced:	
Gould & Curry	39,585.99
Best & Belcher	57,458.00
Ophir	39,273.41
Mexican	23,328.57
Exchequer	29,040.20
Alpha	20,659.80
Challenge	1,323.72
Bullion	68,950.00
Con. Imp	25,292.88
Overman	29,513.50
Savage	19,497.36
Interest due and unclaimed	10,040.00
Balance—Surplus Fund	371,824.33
	$6,623,587.76

From Superintendent Thomas' report we take the following: "Since my last annual report, the work underground has been confined almost entirely to making the necessary repairs in the main tunnel and south Lateral tunnel. About 2,800 ft. of drain boxes were also laid down. At No. 2 shaft most of the machinery and buildings have been taken down and sent through the tunnel to the dump. Repairs and retimbering at the Turbine-wheel Tunnel are still under way. At present the Alta Company, under arrangement with the Gold Hill Pumping Association, is sending through our tunnels 1,700,000 gallons of water each 24 hours. It expect soon to have its large Cornish pumps ready for use. The Pumping Associationare also sending through the Crown Point Drift about 600,000 gallons of water each 24 hours. It is now using one large Dow pump and expect to have another ready for operation shortly. The capacity of these two pumps is about 1,400,000 gallons each. The Nevada Mill, which is run by the dynamos on the Sutro Tunnel level, has recently been started up, causing a flow of about 1,200,000 gallons per 24 hours through the tunnel; there is also flowing through the tunnel about 350,000 gallons of water from the North End mines, making a total of about 3,850,000 gallons per 24 hours flowing through our drains. The capacity of the main tunnel drain boxes will equal 8,000,000 gallons per 24 hours.

"Our main tunnel cuts the Brunswick lode at a point 10,600 ft. from the entrance. If drifts were run north and south on the Brunswick, it would enable quite a number of mining companies to work their claims, and transport their ore and waste rock through the tunnel. They would pay royalty, and thus this company would be benefited, and new mines opened. I would recommend that some arrangement be made to run these branch drifts. This lode is 150 ft. wide and very promising. The croppings are traceable 2½ miles on the surface, from the Monte Christo on the north, to the Occidental on the south. More than two millions of dollars have been taken from the croppings and downward for 500 ft. When the resources of this company will admit of it, I would particularly recommend the extension of the main tunnel west, to and under Mt. Davidson. There is no doubt that in the extension of the tunnel, it would pass through a belt of Syenite rock, but to what extent the same may be I have no means of knowing, but with our superior drilling plant, good progress could be made."

NEW MEXICO.

SIERRA COUNTY.

GRAND CENTRAL.—It is reported that this mine at Kingston has been sold to an English syndicate for $1,000,000 cash. The new owners, it is said, will build a railroad from Lake Valley to the mine to handle the ore.

NORTH CAROLINA.

(From our Special Correspondent.)

MONTGOMERY COUNTY.

Nothing has yet been done on the recent find on Buck Mountain. Several parties claim the land, and its ownership will probably be a matter for court decision. Several good finds have lately been made in this district and considerable activity prevails.

RUSSELL.—Forty stamps are running at this mine, and it is reported that bullion is being regularly sent to the company in London. Mr. C. S. Bailey, president of the Gold Ores Reduction Company, is superintending the work.

STANLY COUNTY.

JIM.—The stamp mill at this mine is about completed and will be started up about the 15th. The shaft is down 96 ft. on the 3-foot vein, and the ore is said to be better than any heretofore taken out.

PARKER FREEHOLD.—Captain Judd, manager of these mines, has just returned from London, where he has been attending a company meeting. It is reported that a shaft will be sunk 300 ft. for exploitation purposes. The next clean up on this property is expected to be a good one, as the gulch for boxes is completed, and the ground now being hydrauliced, it is said, is the best that has so far been washed.

OHIO.

COAL.

The rumors that the Executive Board of the United Mine Workers, which met during the week in Columbus, would decree a strike of the coal miners is decried by President Costello. The meeting adjourned without making any decision on the eight-hour question.

PENNSYLVANIA.

COAL.

DELAWARE & HUDSON CANAL COMPANY.—Nearly 200 acres of ground in the northwest corner of Carbondale, under which the Coal Brook colliery of this company is opened, are considered to be in imminent danger of caving in. The 200 mine workers have been ordered out of the colliery. The ground is said to be heaving as if by an earthquake.

PHILADELPHIA & READING COAL AND IRON COMPANY.—An accident occurred at this company's Richardson colliery on the 3d inst. It took place between breasts 4 and 5 on the third lift of the Crosby vein gangway. The men had been "skipping" pillars, and it is at present believed that two pillars and the chain pillar, which is between the second and third lifts, rushed down, bringing down the water on the upper lift. This blocking of the gangway imprisoned six miners, who are probably dead. Despite great efforts the bodies of the entombed men had not been reached at this writing.

NATURAL GAS.

CLARION & TYLERSBURG GAS COMPANY.—This Company has been incorporated to build a pipe line through the townships of Clarion, Limestone, Monroe, Peney, Paint, Elk, Highland, Knox, Farmington, Washington, Mill Creek, Green, Jenks, and Tionesta. The capital stock of the company is $78,000; the treasurer, F. M. Arnold, of Clarion, Pa.

OIL.

The Greenleaf & Forest well No. 1 in the McDonald field, Washington County, is now flowing at the rate of 15,000 barrels per day. The well had been doing 9,000 barrels a day from the time when struck last week until the 5th inst. On the latter date an attempt to lift out the drilling tools was made, when the flow increased to present figures. No further attempt to recover the tools was made. About one-sixth of the flow is lost. Two other wells are being drilled upon the same farm.

UTAH.

The receipts of ore and bullion at Salt Lake city for the first nine months of 1891 were: Bullion, $3,839,594; ores, $3,492,650, total, $7,332,244. The shipments from Salt Lake for the same period were 473 cars of bullion weighing 15,215,005 lbs.; 167 cars of lead weighing 4,620,462 lbs.; 48 cars of matte weighing 1,835,760 lbs.; 2,566 cars of ores weighing 100,508,755 lbs.; total number of cars 3,254; total weight of shipments, 122,179,982 lbs.

SUMMIT COUNTY.

DALY MINING COMPANY.—This company received $34,069.49 from the sales of ore during September. The total product for the first nine months of 1891 is: Sulphides, $220,195.44; ore sales, $202,578.81.

ONTARIO SILVER MINING COMPANY.—This company's product for September amounted to 715,720.26 ounces of bullion, and $66,166.72 from sales of ore. The total for the first nine months of 1891 is: Bullion, 715,720.26 ounces; ore sales, $534,324.51.

WASHINGTON.

KITTITASS COUNTY.

BLACK.—The report comes from Cle-Elum that this placer claim, said to be the most valuable in the Swauk mining district, has been sold to Port Townsend parties represented by Leslie Cullom and E. S. Campbell. The property, it is said, has yielded from $5,000 to $12,000 yearly for the past 12 years by the old sluice plan. All the modern placer mining methods will be introduced at once.

OKANOGAN COUNTY.

JOHN ARTHUR.—This mine, which is owned by J. T. McDonald and J. T. Robertson, is an extension of the Lone Star mine, in the Okanogan district. It has been recently opened up and the shaft sunk 100 ft. A body of silver glance ore has been struck, which is said to be richer than that of the Lone Star.

WYOMING.

The Cheyenne *Commonwealth* says the mineral exhibit at the recent mining convention in extent, variety and excellence, was never before equaled in the State. The large area of the State and lack of transportation facilities in some quarters delayed the arrival of some of the finest portions of the display, and it was not till the last day that it was seen in full proportions.

FREMONT COUNTY.

It is reported that Dr. Emile Granier, manager of the French syndicate which is operating the Christina Lake placers, has made a rich strike in a quartz vein that he has been prospecting for some time. The find is near Lewiston, 11 miles below Atlantic. The lead uncovered is thought to be an extension of the Burr mine, a lode which is considered to be very rich. The ore streak struck by Dr. Granier is 22 in. wide and assays very high. A ton of the quartz has been sent to Denver to be sampled. Local papers report that the clean-up from the Christina Lake placers this season amounted to 420 lbs. of gold, worth over $90,000.

FOREIGN MINING NEWS.

CANADA.

PROVINCE OF BRITISH COLUMBIA.

NELSON DISTRICT.

(From our Special Correspondent.)

SALMON RIVER.—High grade galena and copper ores have recently been discovered near the river, south of Nelson. Two samples gave returns of: Silver, 286 oz. per ton; gold, $3; lead, 20%; copper, 5%; silver, 193 oz.; lead, 35 per cent.; copper, 3%; while some of the copper ore (gray copper) gave 295 oz. silver, $10.20 gold, and 6¼% copper. A number of locations have been made, and the discovery seems to be an important one.

STADACONA SILVER-COPPER MINING COMPANY, LIMITED.—This company is now working the Grizzly Bear mine. Its capital stock is $100,000 in $1 shares: First trustees, C. T. Dupont, P. C. Dunlevy, J. Irving, C. D. Rand, J. Grant, all of Victoria, B. C. J. E. Boss, of Spokane, Wash., owns half the stock. Houses have been built on the property, and three shifts are running a tunnel westerly from near the east end of the claim. The tunnel, which apparently is off the vein, there being practically no mineral in the face, is in about 80 ft.

VENETIA BOY.—The shaft on this property lying west of the Iroquois, is down 70 ft. in ferruginous vein matter carrying from $4 to $42 per ton.

WHITEWATER MINING COMPANY.—A report has been made on the claims of the company owning the Whitewater, Midair and Columbia locations, by G. E. R. Ellis, M. E., of Nelson. The plant now in operation is small, viz., a 3-ft. 6-in. Huntington mill and one Triumph vanner, and was put in to test the property on a working scale. After a short run, serious leakage was discovered at the sectional points of the mill bottom and the foundation of the vanner gave way at the upper end. The plant therefore has been taken to pieces and re-erected in a more substantial manner. Good results are now being obtained, the extraction running from 86% to 94%, the greater part of this being in free gold. The property has been developed by two tunnels run in on the veins—two in number—but work is now being devoted to stripping the ledges on surface, with the intention of running a tunnel on the ore from a point lower down the hill. Much of this surface ore carries well in free gold, frequently assaying over $200 per ton.

PROVINCE OF NOVA SCOTIA.

Another strike is threatened by the coal miners at Spring Hill, for the enforcement of the agreement made last autumn regarding the weight o loaded coal boxes.

CHINA.

It is reported that tin has been discovered at Kowloon, opposite Hong Kong. The deposits are said to have been exposed by the heavy rainstorms of recent years. A local firm has obtained from the Colonial Government a concession to work the fields.

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, Oct. 9.

Heavy Chemicals.—The heavy chemical market for the week under review does not present any marked general features other than those which have been previously mentioned. The supply in almost all commodities is moderate, there being neither an excess or a shortage. The demand is steady and of fair proportions. The window-glass manufacturies have not resumed, and as a rule have not been in the market to any great extent. Bleaching powder is the strongest article on the list.

Caustic Soda.—Mexican shipments continue. The domestic demand in both spot and futures has been rather light. We quote: 60%: 3·25@3·30c. for spot and 3⅛c. for futures. 70@74%: 3·05@3·07c.; 76%: 3·20@3·25c.; 77%, strong at 3⅛c. spot and 3·05c. futures.

Carbonated Soda Ash.—Owing to delay of glass manufacturers in entering the market the commodity is not enjoying its usual fall demand. The price has hardened a little. We quote: 48%, 1·60@1·65c.; 58%, on basis of 48%, old process ashes, 1·55@1·57½c.

Caustic Soda Ash.—The market is almost bare of stock, and the demand is light at 1·57½@1·60c. There will probably be a change to higher prices by next week.

Alkali.—The spot demand has fallen to almost nothing. There is considerable trading in futures. B. M. 48% is selling at 1·55@1·60c.; high test B. M. at 1·47½@1·50c.

Bleaching Powder.—This market seems to be completely in the hands of the Alkali Union. The numerous small floating stocks have been gathered in by consumers, and are held so firmly that the price has jumped from 2·10c. to 2·25c.

Sal Soda.—The market is well stocked. There is manifest by the consumers a decided disinclination to contract ahead at prices offered, owing to the fact that the manfacturers will soon resume production. Spot goods are quoted at 1·10@1⅛c.

Fertilizers—The market is commencing to feel the stimulating effects of a good fall trade. The demand comes principally from the South and North. The manufacturers in the latter section seem to be looking ahead by providing for the future. Prices as a rule are unchanged, although there is an upward tendency.

Sulphate of Ammonia.—Demand good, stocks light; 3·05c.@3·10c. is quoted for spot, 3·10c. for November, and 3·15c. for December and January shipment. The stock of bone sulphate has been nearly all sold out at 3·02½c.@3·05c.

Dried Blood is of light stock owing to the demand. It commands $2 per unite. Tankage is quite scarce and is firm at $19@$21. The same can be said of azotine, which comands $2 per unit. Bone meal, owing to market conditions, has risen $1.00 and is now quoted at $22@$23. It is in scarce stock. Acidulated fish scraps is worth $11.50.

Double Manure Salts.—The fact that sales have been made well ahead renders the market quiet. We quote the syndicate price of 1·10@1·12½c. for 48%. For 90% to 95% basis, 90% foreign invoice, weights and lists, 2·07½@2·10c. Lots under 50 tons are proportionately higher.

South Carolina phosphate rock continues. Prices, which are as follows: Land rock $6.50@$7.50, wet and dry, respectively, f. o. b. vessels at mines, and $6.75@$7.75 f. o.b. cars. Low-grade river rock taken from the marshes is selling at about $6.75.

Kainit is quiet at $8.75@$9.25 according to quantity.

Nitrate of Soda.—The market continues to rise and at the same time puts forth the promise of sustaining values. Word reached the city this week that all the Chilian companies except the Autofagasta had agreed to suspend steamer shipments to Europe during the months of January and February. The European spot price is 2.10c. In the local market the quotations are as follows: 2·08c. for spot, to arrive 2·12@2·15c., and 2·05@2·07½c. for November and December shipments. The Norris arrived this week with 11,900 bags. The sales for the week were about 7,000 bags.

Messrs. Mortimer & Wisner, nitrate brokers of this city, furnish the following interesting statistics, issued under date of October 1st.

	1891. Bags.	1890. Bags.	1889. Bags.
Imported into Atlantic ports from West Coast, S. A., Jan. 1—Oct 1, 1891..	524,559	549,721	375,617
Imported into Atlantic ports from Europe, Jan. 1—Oct 1, 1891.....	18,802	.....	.....
	543,361	549,721	375,617
Stock in store and afloat Oct. 1, 1891, in New York	73,070	41,209	44,977
" " " Boston.....	900	.....	.....
" " " Philadelphia.	.....	.....	.....
" " " Baltimore....	3,500	7,500	7,000
To arrive, actually sailed	134,500	.....	.....
Additional charters.....	203,000	343,600	289,000
Total supply, when shipped	414,970	392,309	340,977
Visible supply to Dec. 1, 1891.....	211,970	.....	.....
Stock on hand Jan. 1.....	36.454	22,009	84,043
Deliveries past month...	84,640	58,464	45,415
Deliveries since Jan. 1 to date.....	503,345	522,021	414,683
Total yearly deliveries...	.....	673,679	516,559
Prices current Oct. 1	2·05@2·07½	1·77½@1·80	1·87½@1·9

The United States Consul at Iquique, Chili, in a recent dispatch to the Secretary of State, says that the marking of bags of soda nitrate shipped to the United States from Chili is attended with loss and delay, and that if the requirement is insisted upon the directors of the nitrate establishments in Chili will divert the current of their shipments to Europe. The dispatch was referred to the Treasury Department, and in reply the Secretary of the Treasury has informed the Secretary of State that the Department, under date of January 28th, 1891, held that the provisions of section 6 of the Tariff act do not contemplate the marking of coverings of crude or other substances of a moist or delinquent nature, like certain kinds of sugar in mats, etc., where the permanent marking of the packages by any means whatever would be totally impracticable. In the opinion of the Department, he says, the last-mentioned ruling should be applied in this case, and if, as alleged, the marks on bags of nitrate of soda would become obliterated in course of transportation to the United States, the bags may be delivered upon entry without the requirement of marking of the name of the country of origin thereon.

Acids.—The acid market continues in its upward course. The long looked for "higher prices" seem to be a condition of the near future. The advance in 66% sulphuric to 1½c.@1½c., chronicled in our last, seems to have been generally accepted by all factions of the trade, and is now ruling. Chambers acid continues to maintain its advance price of $9@$10.50. There has as yet been no advance in nitric, and for the reason that manufacturers are fairly well stocked with nitrate of soda. With the diminution in these stocks, in the face of the high price of the raw material, an advance in the manufactured product is almost a certainty. We quote per 100 lbs. in New York: Acetic, $1.65@$1.75; alum, lump, $1.60@$1.70; muriatic, 18°, 90c.@$1; 20°, $1@$1.12½; 22°, $1.12½@$1.25; nitric, 40°, is selling for $4.50, and from that upward, according to quality, etc.; 42°, $5@$6; oxalic, $7@$7.25; $3.30@$3.40.

Blue Vitriol.—The market is quiet; 3⅛c. is quoted. This figure could be shaded an eighth on a large order.

Brimstone.—The market continues at top notch prices. The spot stock is a little freer and sales were made this week at $31.00., and can be duplicated. Seconds to arrive by the 10th inst. are quoted $30⅛, and thirds $29⅛. We learn of an offer made to a firm in this city by Japan producers according to the terms of which they will contract to lay down 1,000 tons of brimstone in New York within five months from November 1st, for $26 per ton. It was not accepted.

Liverpool. Sept. 30.

(Special Correspondence of Joseph P. Brunner & Co.)

Business is not very active just now, although several alterations have been made to-day in prices. The "Chemical Union" is threatened with serious opposition in the North, as negotiations are now in course of progress with consumers in that quarter.

Soda Ash in fair request and quotations have been altered to day as follows, viz., all net cash: Caustic ash, 48%, £5 6s. 3d. per ton; 57@58%, £6 7s. 6d. per ton; carb. ash, 48%, £5 9s. 9d. per ton; 58%, £6 12s. 9d. per ton; ammonia ash, 58%, £6 7s. 6d. per ton.

Soda crystals are firm at £3 12s. 6d.@£3 15s. per ton. The prices have been altered to these figures to day, and although they nominally point to an advance the terms are now quoted less 5%, so that actually the price is a little easier than when last advised, taking into account the alteration in terms.

Caustic soda is flat, and in order to meet competition in Russia the prices for that particular market have been reduced 5s. per ton; this reduction, however, only applies to Russia, and for other quarters, quotations are unchanged as follows, viz: 60%, £9 10s.@£9 15s. per ton; 70%, £10 15s.@£11 per ton; 74%, £11 15s.@£12; 76%, £13 5s. and upwards, according to quantity and all net cash. For contracts over 1892, 7s. 6d. per ton less money for 60% and 10s. per ton for 70%, and higher strengths will be accepted. Consumers are not anxious to contract, as prices are still very high even at the reduction.

Bleaching powder dull, but nominal. Quotations are £7 15s.@£8 per ton for hardwood, for any delivery. There is nothing on the market for America.

Chlorate of potash is slow of sale, although still nominal is quoted at 5⅝d. per lb. less 5%.

Bicarb. soda meeting with a good inquiry at £8 15s.@£7 per ton less 2½% for one cwt. kegs, according to brand and quantity, with usual allowances for larger packages.

Sulphate of ammonia is not active and nearest values are £10 16s. 3d.@£10 17s. 6d. for good grey, 24% in double bags, and £11 1s. 3d.@£11 2s. 6d. per ton for 25% in double bags less 2½% f. o. b. Liverpool.

Oct. 1.

(Special report from Geo. G. Blackwell.)

There is no alteration to report in the mineral market this week, which has ruled steady. Manganese: Arrivals this week small; prices are unchanged. Magnesite moves slowly, prices in favor of buyers; raw ground £6 10s. and calcined £12 10s. French chalk: Arrivals somewhat larger most of which have gone into consumption; prices are firm, especially for G.G.B; "Angel White" brand—97s. 6d. to 105s. medium, 110s. to 120s. superfine. Barytes: Carbonate easy; whilst finest white sulphate is scarce; "Angel White," No. 1, 70s.; No. 2, 60s.@65s.; No. 3, 45s. Pumicestone: Picked lump, steady; ground, more doing. Iron ore: Manganiferous, Santander, and other qualities easy; Irish and Cumberland inquired for. Emerystone: Best brands in fair demand at full prices. No. 1 lump £5 10s.@£6, smalls £5@£5 10s. Fullers' earth unchanged; best lump, 55s. 0d.; fine impalpable ground, £7 0s.; "Emerald" ground, 80s. Scheelite, wolfram, tungstate of soda, and tungsten metal continue in demand at full prices. Chrome ore steady; prices unchanged. Antimony ore and metal has a downward tendency. Asbestos easier. Potter's lead ore of best quality sought for; smalls, £13 to £14; selected lump, £15 to £16. Feldspar and fluorspar easier. Ferromanganese: Easy; 75%, £12; 85%, £13 15s. Plumbago: A fair business doing at good prices; Spanish, £6; best Ceylon lump at last quotations; Italian and Bohemian, £4 to £12 per ton. "Founders," £5 to £6. Ground mica, £30 and upward. China clay steady; common, 18s. 6d.; good medium, 22s. 6d. to 25s.; best, 30s. to 35s. (at Runcorn).

MINING STOCKS.

[For complete quotations of shares listed in New York, Boston, San Francisco, Baltimore, Denver, Kansas City Birmingham, Ala., Pittsburg, St. Louis, London, and Paris, see pages 442 and 444.]

NEW YORK, Friday Evening, Oct. 9.

For months past readers of our mining news columns must have noticed that great activity has prevailed this year throughout the western mining states. At the same time, those who have read our weekly reviews of the mining stock market have also seen that we have reported an exactly opposite state of affairs in the latter. The dullness at the mining exchange has not been in direct proportion to the activity at the mines themselves; not quite, perhaps, but very nearly.

Of the Comstocks there were sales of 232 shares of Consolidated California & Virginia at $5.38@$5.63; 550 shares of Crown Point changed hands at $1.40@$1.60; of Gould & Curry 325 shares were sold at $1.95@$2.05; Hale & Norcross had sales of 200 shares at $1.50 and $1.65; 450 shares of Ophir were disposed of at $3.50@$4.10. There were only 230 shares of Savage sold at $2.75@$3.20. Of Sierra Nevada there were sold 350 shares at $2.50@$2.65. This company has levied an assessment of 50c. per share. Yellow Jacket had transactions aggregating 500 shares at $1.60@$1.90; Alta shows sales of 853 shares at 30@55c.; an assessment of 30c. has been levied by this company. Of Best & Belcher there were sales of 500 shares at $2.75@$3.35; 500 shares of Chollar changed hands at $1.45@$1.65; Mexican was dealt in to the extent of 620 shares at $2.25@$2.80; Occidental had a solitary transaction of 500 shares at 85c.; Potosi declined during the week from $2.50@$1.75. 250 shares being disposed of. Of Union Consolidated there were 200 shares at $2.50 and $2.60, and of Utah 1,100 shares at 55@75c.

Barcelona had a single sale of 200 shares at 70c. Martin White one of 300 shares at $1.35.

Of the Tuscaroras, only Commonwealth was dealt in; 200 shares were sold at 35c.

Among California stocks there were sold 400

shares of Bodie Consolidated at 45c. Mono was stationary at 10c. Standard was again in demand; only 1,000 shares at $1.10@$1.45 were sold, but this comparatively small number of shares sold is due to the fact that holders of this stock do not appear willing to offer it below these figures. Of Belmont there were 1,500 shares sold at 90c. The superintendent of this company telegraphed yesterday that the ore breast is improving daily, and that the yield from the sluice plates is increasing. Brunswick Consolidated shows transactions aggregating 1,800 shares at 8c.@12c., the latter figure being for assessment paid.

Mr. H. R. Lounsbery, treasurer of this company, informs us that 470,000 shares out of the 500,000 have paid the assessment, and that he has yet to hear from the San Francisco office, where the assessment will not be delinquent until the 15th inst. Middle Bar turns up this week with sales of 1,500 shares at 2c.

Among the Colorado stocks we note sales of 500 shares of Breece at 50c. The alleged sales of Freeland continue with a vengeance. This week, so say the lists of the Consolidated Stock and Petroleum Exchange, 21,400 shares were sold at prices ranging from 10c. to 12c. Ugly rumors about this company are numerous at the Exchange, but inasmuch as their veracity could not be ascertained, we refrain from printing them. There were sales of 500 shares of Leadville Consolidated at 12c. and of 100 shares of Robinson Consolidated at 40c. Silver Cord shows sales of 200 shares at 20c.

Horn Silver this week shows transactions of only 300 shares at $3.40@$3.50. The annual meeting of this company took place at Frisco, Utah. The elections resulted as foretold in last week's issue of the ENGINEERING AND MINING JOURNAL, namely in the re-election of all the officers, as follows: A. C. Washington, President; B. Mc E. Whitlock, Vice-President; A. I. Harrison, Secretary and Treasurer; E. T. Farnsworth, manager.

Of the Black Hills stocks, Deadwood Terra was in fair demand, although only 100 shares at $2 were sold. The smallness of this sale is probably due to the fact that the stock if rather closely held. Iron Hill had a single of 100 shares at 20c.

El Cristo shows sales of 400 shares at 57c @60c. None of the rumors concerning this company has as yet assumed a definite form.

Mutual Smelting and Mining Company, which had not been traded in for a long time, had a sale this week at 60c.

Phœnix of Arizona appeared in considerable demand this week, 5,600 shares being sold at 50c.@53c. There was a single sale of 400 shares of Silver Queen at 2c.

There were 11,000 shares of Comstock Tunnel stock sold during the week at 18c.@20c. The annual report of this company will be found elsewhere in this issue. A telegram from San Francisco received as we go to press says that the contract between the Consolidated California and Virginia, Savage, Hale & Norcross mining companies has been sent to this city for the signature of the Comstock Tunnel Company. It provides for the removal of waste rock from the lower levels of these companies, mines by way of the Comstock Tunnel at 40c. per ton, all waste to be dumped outside the tunnel. The tunnel company will put in an engine to take the place of the mules now employed, and will thus effect a great saving to the mines. Other companies along the line of the tunnel will be allowed to enter on similar terms.

Boston. Oct. 8.

(From our Special Correspondent.)

The downward tendency of the market for copper stocks continues, and there has been very little doing in them the week past. Orders to purchase are few, and prices easily decline whenever there is any pressure to sell. The lower quotations for ingot copper abroad is no doubt responsible, to some extent, for this condition of the market, and until there is a change in this respect we do not look for greater activity or higher prices. Calumet & Hecla declined from $269 to $265 on very small transactions. Tamarack sold up to $178 dividend on, and later at $173 ex-dividend, which is a gain of $3 over last week.

The Montana stocks have ruled dull with lower prices. Boston and Montana touched $47½ during the week, but declined to-day to $45¼, the lowest point since August 29th. Butte & Boston advanced to $18½, but lost it, and touched $17¼ to day.

Franklin declined to $17 after selling quite freely at $17½.

Centennial continues weak and sold down to $15, a decline of $2¼ for the week.

Kearsarge has been quite steady at $15@$15½, with a few sales at $16.

Osceola was up to $38 early in the week, but last sales were at $37. Wolverine declined to $5¼, with latest sale at ½ higher.

Atlantic sold at $14½; same as last week.

Allouez declined to $1½ and a small lot of Arnold sold at $2.

Huron declined to 25c. on the report that a $3 assessment was to be levied in the near future.

Santa Fe sold down to 40c.

In Silver stocks Breece sold at 50c.

3 P. M.—The market was unchanged after the noon hour with the exception of Santa Fe and Huron; the former advanced to 47½c., and the latter to 35c.

Denver.

Prices and sales for the week ending October 3d, 1891:

Company.	Opening.	H.	L.	Closing. Bid.	Sales
Mines.					
Alleghany	25a	....	....	25a	.....
Amity	02¼b	*03	02½	02¼b	16,600
Bangkok-C.-B.	05¾b	†06¼	05½	05b½	7,100
Bates-Hunter	69a	66	65	67a	300
Brownlow	†12	†12	10¼	10¼b	17,000
Calliope	20a	15½	15½	14½b	100
Cash	20a	....	....	17a	.....
Clay County	*122b	120	120	115b	100
Gettysburg	20b	20	20	20b	5,100
Gold Rock	70a	68	65	64b	1,500
Leavenworth	08b	08	08	08a	100
Little Rule	†110b	....	....	†110b	.....
May-Mazeppa	*125a	*118	106	*117b	300
Matchless	....	....		285b	.....
Oro	75b	....	....	99b	.....
Pay Rock	02½b	03	02½	02½b	1,500
Puzzler	04a	02½	02½	02b	100
Reed National	....	...	...	...	.....
Rialto	112a	....	....	111a	.....
Running Lode	22b	†24	23	23b	15,400
Whale	11b	....	....	*11b	.....
Bal. Smuggler	59a	..	....	59a	.....
Prospects.					
Argonaut	...	....	....	06b	.....
Big Indian	15a	....	....	06b	.....
Big Six	07	07½	07	07¼b	2,600
Claudia J	05¾b	06	05	05¼b	6,900
Century	35½	*36½	32	36b	10.800
Diamond B	02¾b	03¼	02½	03b	9,500
Nat. G. & Oil Co	13b	*14¼	12¾	13¼a	4,400
Emmons	46a	*48	45½	45½b	8,000
Golden Treas	73b	*79	74	74b	800
Ironclad	06¼b	*08½	06¼	07¾b	31,100
John Jay	03¾b	*01	03½	03½b	16.600
Justice	13¾	*15	13½	13¼b	5,500
Morning Glim	49a	....	....	....	.....
Park Consolidated	10b	....	....	06b	.....
Potosi	03¼b	03¼	03	03b	4,100
Total					165,600

* Buyer 30. † Buyer 60. ‡ Seller 60. § Seller 30. a Asked. b Bid.

Lake Superior Iron, Gold and Silver Stocks.

(Special Report by A. M. Helmer, Milwaukee, Wis.)

Iron.	
GOGEBIC RANGE:	
Anvil	$3.00
Ashland	51.00
Aurora	9.50
Bessemer Consolidated Bonds	20%
Brotherton	2.50
Cary	....
Colby	....
Father Hennepin	....
Germania	7.50
Gogebic Iron Syndicate	.25
Iron Belt	2.00
Metropolitan Land and Iron Co	61.00
Montreal	10.50
North Pabst	2.25
Northern Chief	30.00
Odanah	13.50
Pabst	....
Palm	1.75
Pence	1.25
Penokee and Gogebic Developm. Co.	....
Ruby	....
Ryan	.35
Section 33	9.50
Windsor	....
Wisconsin Iron and Steel Co	.50
MARQUETTE RANGE:	
American	$2.25
Champion	80.00
Cleveland	16.00
Cleveland Cliff Iron Co	....
East New York	2.00
Humboldt	....
Iron Cliffs	...
Jackson	104.00
Lake Superior	58.00
MARQUETTE RANGE:	
Michigamme	.....
Milwaukee Iron Co.	$5.00
Negaunee	....
Pittsburg and Lake Angeline	145.00
Republic	27.00
Riverside	2.00
MENOMINEE RANGE:	
Aragon	....
Chapin	....
Commonwealth	10.50
Florence	....
Hamilton Ore Co	....
Lincoln	2.00
Mansfield	....
Mastodon	....
Monitor	....
Norway	....
Paint River	....
Pewabic	....
Quinnesec	....
Sheldon and Shafer	....
Sheridan	5.00
Vulcan	....
Youngstown	....
VERMILION RANGE:	
Chandler	40.00
Chicago and Minnesota Ore Co	105.00
Clingstone	.25
Inter-Ocean	.25
Minnesota Ore Co	83.00
Northwestern	.25
Pioneer	....
Vermilion	.25
Vermilion P. & L. Co	2.25
Gold and Silver.	
Badger Silver Mining Co	2.00
Michigan Gold Co	.30
Peninsula Gold Mining Co	....
Ropes Gold and Silver Co	1.30

San Francisco. Oct. 1.

(From Our Special Correspondent.)

No material change has taken place in the mining stock market during the past week, business having continued dull with prices generally showing a decline. Consolidated California & Virginia, that a week ago sold for $6.00, has been ruling to-day at $5.62½, but no one seems to doubt but that the present weakness in the old bonanza stock is simply in answer to manipulation, and not owing to any particularly discouraging outlook in the mine, U. C. no uneasiness is felt. And this, too, notwithstanding the systematic bearish proclivities of the daily press.

Ophir, ruling at $3.60, sold at a decline of $1.48 on the ruling rates of last week, and Mexican at $2.45; and Sierra Nevada at $2.60 also sold at a decline.

The middle Comstocks, with the exception of Savage, have been heavy and comparatively neglected by buyers; Bullion ruling at $1.50; Chollar with nominal sales at $1.45; Overman at $1; Occidental at 75 cents. All were weaker than at the opening of the current week. Savage, however, that sold last week at $2.60 has sold at better prices since and was quoted to-day at $3.10, with sales of 1,050 shares on early call. The main reason for the unexpected strength displayed by Savage stock is the curious tangle in which the company is becoming involved in the law courts, and until something definite in the way of a settlement has been arrived at it is quite likely that the stock will be sustained by the insiders.

All the Gold Hill stocks have been obtainable at a trifling reduction on ruling prices of last week. Kentuck has sold for 20 cents; Segregated Belcher at 65 cents, and Yellow Jacket at $1.55, with sales light.

Holders of outside stocks, such as Eureka Consolidated, Standard Consolidated, the Bodie, Tuscarora and Quijotoa, have reason to despair. For months the sales in these various groups have been nominal only, and during some weeks they have been called only to get a quotation. During the early session to-day Bodie sold for 40c.; Commonwealth, 25c.; Nevada Queen, 10c., and Silver King, 30c.

Trading has been so dull that the San Francisco Stock Exchange has on several days made an early adjournment.

SAN FRANCISCO, Oct. 9. [*By Telegraph.*]—Quotations to-day show no great change over the prices which have prevailed during the week. The closing prices are as follows: Best & Belcher, $2.95; Bodie, 50c.; Belle Isle, 45c.; Bulwer, 25c.; Chollar, $1.40; Consolidated California & Virginia, $6; Eureka Consolidated, $1.60; Gould & Curry, $1.80; Hale & Norcross, $1.50; Mexican, $2.60; North Belle Isle, 40c.; Navajo, 10c.; Ophir, $3.70; Savage, $2.85; Sierra Nevada, $2.35; Union Consolidated, $2.40, and Yellow Jacket, $1.65.

Salt Lake City.

Prices and sales for the week ending Oct. 3, 1891.

Name and Location of Company.	Opening.	Highest.	Lowest.	Closing.	Sales.
Alice, Mont	....	....	....	....	....
Alliance, Utah	.80	.80	.80	.80	....
Anchor, Utah	5.10	5.25	5.00	5.25	....
Apex, Utah	.14½	.15	.14	.14	5,000
Barnes Sulphur, Utah	.02	.03	.01	.03	7.200
Big Hole Placer, Mont.	.12	.12	.09	.10	5.0
Centen'l Eureka, Utah	....	45.00	45.00	....	....
Cleveland Cons'l, Utah	....	....	....	....	....
Congo, Utah	.15	.15	.12½	.14	5,000
Crescent, Utah	....	.50	.42½	.45	1,500
Daly, Utah	20.00	20.25	20.00	20.25	....
Glencoe, Utah	....	....	....	....	....
Horn Silver, Utah	3.35	3.35	3.25	3.25	100
Malad Con., Idaho	....	....	....	....	....
Mammoth, Utah	2.85	3.05	2.60	2.95	100
North Eureka, Utah	....	....	....	....	....
Northern Spy, Utah	....	....	....	....	....
Ontario, Utah	....	38.50	38.50	....	....
Stanley, Utah	.08¼	.08½	.06½	.06½	11,000
Utah L. & C. Co., Utah	....	....	....	....	....
Utah Oil Co., Utah	....	....	....	....	....
Woodside, Utah	....	....	....	....	....
Total sales					30,400

DIVIDENDS.

Deadwood Terra Mining Company, dividend No. 34, of five cents per share, $10,000, payable October 20th at the office of Messrs. Lounsbery & Co., Mills Building, No. 15 Broad street, New York. Transfer books close October 15th and reopen October 21st.

Standard Consolidated Mining Company, dividend No. 76, of 10 cents per share, payable October 26th, at the office of the company, No. 310 Pine street, San Francisco, Cal., and at the Farmers' Loan and Trust Company, No. 20 William street, New York City. Transfer books close October 17th.

ASSESSMENTS.

COMPANY.	No.	When levied.	D'l'nq't in office.	Day of sale.	Am't. per share.
Bodie Con. Cal	13	Sept. 22	Nov. 5	Dec. 9	.25
Brunswick Con., Cal.	2	Sept. 11	Oct. 15	Nov. 9	.02
Combination, Mont.	.	Sept. 19	Oct. 24	Nov. 21	.03
Con. New York., Nev.	6	Sept. 28	Nov. 2	Nov. 24	.15
Con. St. Gothard, Cal.	3	Sept. 10	Oct. 14	Oct. 31	.05
Del Monte, Nev	5	Sept. 28	Nov. 3	Nov. 30	.10
Equitable, S. Dak	4	Sept. 9	Nov. 7	Nov. 30	.025
Garden Gravel, Cal.	..	Sept. 17	Oct. 27	Nov. 17	.10
Imperial, S. Dak	..	Sept. 16	Oct. 20	Nov. 7	.0015
Keystone, Cal	1	Sept. 18	Oct. 21	Nov. 23	2·50
McDonnell, S. Dak.	5	Sept. 16	Nov. 2	Nov. 24	.005
Monte Cristo, Nev.	5	Aug 17	Sept. 23	Oct. 14	.25
Mono	31	Sept. 17	Oct. 27	Nov. 30	.25
Morning Star, Nev.	9	Aug. 14	Sept. 30	Oct. 30	.01
Mount Terry, S. Dak	3	Aug. 31	Oct. 8	Oct. 29	.001½
North Belle Isle, Nev	18	Aug. 28	Oct. 2	Oct. 30	.25
North Gould & Curry, Nev	13	Sept. 1	Oct. 2	Oct. 19	.10
Peerless, Ariz.	17	Sept. 17	Oct. 21	Nov. 15	.10
Pennsylvania, Cal.	10	Sept. 10	Oct. 11	Oct. 29	.05
Silver King, Ariz	7	Aug. 20	Sept. 29	Oct. 27	.20
Taylor Plumas, Cal.	4	Sept. 5	Oct. 5	....	.05
Union, Nev	44	Aug. 31	Oct. 5	Oct. 26	.25
Weldon, Ariz	4	Aug. 25	Oct. 1	Oct. 22	.05
Wood River, Mg. & M. Idaho	3	Aug. 20	Sept. 28	Oct. 26	.005
Yellow Jacket, Nev.	49	Aug. 31	Oct. 2	Nov. 7	.50

PIPE LINE CERTIFICATES.

(Specially reported by Messrs. WATSON & GIBSON.)

The petroleum market has been weak and strong by turns, but quiet. The new and important developments in the McDonald field in Pennsylvania

apparently have but little influence on quotations. The public is trading more than usual, but that is not much.

CONSOLIDATED STOCK AND PETROLEUM EXCHANGE.

	Opening.	Highest.	Lowest.	Closing.	Sales
Oct. 3.....	60¼	60⅝	60	60	28,000
5.....	60	60⅝	59¾	60¼	33,000
6.....	61¼	63⅛	61⅛	63½	71,000
7.....	6·⅜	63¾	62	63¾	103,000
8.....	63¼	63¼	61⅜	61½	61,000
9.....	61	61	60¼	60⅝	62,000
Total sales in barrels					358 000

NEW YORK STOCK EXCHANGE.

	Opening.	Highest.	Lowest.	Closing.	Sales.
Oct. 3.....	59¾	60	59¾	60	23.000
5.....	59⅞	59⅞	59⅞	59⅞	10 000
6.....	59¾	61½	59¾	61½	46,000
7.....	62	62½	62	62¼	27,000
8.....	61½	61½	61	61	30 000
9.....	60½	60½	6C¼	60¼	12,000
Total sales in barrels.....					148,000

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Oct. 9.

STATEMENT of shipments of anthracite coal (approximated) for the week ending October 3d, 1891, compared with corresponding period last year:

PRODUCTION OF BITUMINOUS COAL for week ending October 3d, and year from January 1st:

EASTERN AND NORTHERN SHIPMENTS.

			1890.
Phila. & Erie R.R.....	996	132,709	102,299
Cumberland, Md.....	77,282	3,120,307	2.886,391
Barclay, Pa.....	4,231	140,370	115,595
Broad Top, Pa.....	10,390	371,952	385,665
Clearfield, Pa.....	68,863	2,969,167	2,831,200
Allegheny, Pa.....	17,023	954,751	977,901
Beach Creek, Pa.....	50,016	1,807.425	1,414,739
Pocahontas Flat Top.....	44,435	1,724,703	1,433,262
Kanawha, W. Va.....	48,672	2,014,332	1.560,981
Total	321,908	13,235,716	12,707,433

WESTERN SHIPMENTS.

	1891. Week.	1891. Year.	1890. Year.
Pittsburg, Pa	26,086	937.201	625,920
Westmoreland, Pa.....	27.342	1,474.216	868.734
Monongahela, Pa.....	12,421	455,998	394,097
Total	65,849	2,867,415	1,888,751
Grand total.....	387,757	16,103,131	14,596,184

PRODUCTION OF COKE on line of Pennsylvania R. R., for the week ending October 3d, 1891. and year from January 1st. in tons of 2,000 lbs.: Week, 99.737 tons; year. 3,090,886 tons; to corresponding date in 1890, 4,034,640 tons.

Anthracite.

A new and controlling feature has developed in the coal trade during the week under review. It is an outgrowth of the action of the Western sales agents in continuing for October the Western price of September. This has stimulated line and Western trade to a marked extent. All companies having facilities are sending a heavy tonnage in this direction, and, be it said, to the relief of the Eastern market. They are securing $2.25 at the breaker for egg and stove, which is a much better price than new orders command in the East. This Western movement is likely to continue about six weeks or until the close of lake navigation.

In the local market it is possible to buy good store coal at $4 10 net, as against the October circular of $4.25 net. The independent operators continue to obtain the orders. As a matter of fact there is very little new business, and this the companies are making no bid for under ruling conditions. They are adhering to the terms of their agreement, by refusing new orders offered at less than the October circular rates. They report a good sized tonnage moving on contracts made at September prices before 1st inst.

Owing to the firm position of the companies, which has been maintained for some time, the Western demand and the prospective Eastern demand, the trade is regarded by all to be in excellent condition. The belief prevails that the October circular will rule without a protest during the last half of the month.

Bituminous.

The truism, "no news is good news," applies very aptly to the soft coal market. We can only report the same healthy tone, sustained by a good business at fair prices, that has ruled since midsummer. The demand for tonnage is perhaps a trifle greater than that of last week. This, it is expected, will continue to increase.

The lack of cars, which at this season of the year usually cause, no end of vexation to both producer and dealer, has commenced to make itself felt. The Baltimore & Ohio is reported to be doing a little better by its shippers. The Pennsylvania, which until recently was able to supply all the shipping facilities desired, is said to be somewhat troubled in keeping up its record. So far as we can learn the Norfolk & Western has given its patrons no trouble.

Ocean freights are considerably stiffer with a rising tendency. Small vessels are reported very scarce at Baltimore, owing to bad dispatch and contrary wind. We quote Baltimore to Boston 75c.; to Sound ports, 70c.; Philadelphia to Boston, 70c-; to Sound ports, 60c.; Norfolk to Boston, 60@65c.; to New York, 50@55c.

The coke market, owing to a lack of demand from the furnacemen, is in bad shape. While $1.90 is nominally quoted for Connellsville and $2.15 for Mountain, both f.o.b. cars, it is an acknowledged fact that these rates are being cut.

NOTES OF THE WEEK.

The average price of anthracite coal in the Schuylkill region in September was 2.29\frac{2}{10}$ as compared with 2.24\frac{8}{10}$ in August, and 2.24\frac{1}{10}$ in September of last year. The September price is the highest since February.

The annual report of the Ontario & Western makes the following showing on coal traffic: The amount of coal received from the Scranton division during the year was 495,335 tons. The average revenue received per gross ton on all coal carried from the Scranton division was $1.33. Notwithstanding the coal traffic from the Scranton extension, the coal hauled for the Delaware & Hudson Canal Company by the Ontario & Western Railway, from Sydney to Oswego, was 72,449 tons, an increase of 2,388 tons, or 3.37%, as compared with the previous year.

The Duluth (Minn.) *Herald* quotes Local Manager Fisher, of the Ohio Coal Company, relative to the situation at that point as follows: "Coal docks at the head of the Lake are pretty well filled. I look for additional heavy receipts before the close of the season. Our company has already received over 300,000 tons, or as much as we received in the whole season last year. The receipts of all the companies last year were about 1,500,000 tons, whereas this year they will probably go over 1,700,000. For the past few years, owing to the poorness of the crops, people out on the prairies have been using everything but coal for fuel, but this year they will be flush and will buy coal. If we have a good crop next year the farming country will receive such an addition to its population that the consumption of coal will be materially increased. When there are big crops the railroads have to use a great amount of fuel in hauling them. I believe that with favorable conditions next year the receipts of coal at Duluth will be considerably in excess of 2,000,000 tons." The cars which bring wheat into Duluth will, to a great extent, take back coal to the farmers and to the various railroad coal-yards of the Northwest. Railroad men are fearing that the anticipated famine of cars will make it difficult to ship later on, and are urging the country coal dealers to lay in large stocks at once.

Boston Oct. 8.

(From our Special Correspondent.)

The anthracite coal market continues in good shape. Agents generally are enjoying a fair business, which promises to increase as the fall weather appears. The supplies at this point are of fairly good proportions, though not sufficient to survive an active demand of any great duration. The increased consumptive demand of the past few weeks has stimulated buying on the part of retailers. Egg is scarce and its market very firm. Stove is not over abundant, the market being kept pretty well clear of any accumulation. Broken and chestnut are somewhat neglected. Prices are being maintained fairly well by leading agents, in the face of the concessions being made by individuals.

The bituminous market has worked into a much better condition. Stove is very scarce and agents report great difficulty in getting coal forward. Dealers in many cases are finding it hard to satisfy the demands of their contracts and are buying where they can. Prices are firm, lots on cars commanding $3.50.

The freight situation contains unchanged with ample tonnage offering. From New York 45@50c. is quoted; from Baltimore 70@75c., and from Philadelphia 60@70c.

The retail business is brisk and at a good, steady price. Dealers are keeping their stocks up and have now on hand a fair supply. The weather is favorable to consumption and promises to continue so for some time.

The receipts of coal at this port for the week ending October 3d, were 37,673 tons of anthracite and 15,439 tons of bituminous, against 26,164 tons of anthracite and 7,123 tons of bituminous for the corresponding week last year. The total receipts thus far this year have been 1,460,437 tons of anthracite and 884,663 tons of bituminous, against 1,274,564 tons of anthracite and 848,597 tons of bituminous for the same time last year.

Buffalo. Oct. 8.

(From our Special Correspondent.)

Our local dealers report trade in anthracite very quiet for the past week. The weather has at last become "fall like," therefore fires will be necessary from this time until next May or June and coal will be in demand. There are no special incidents to relate. The retail prices are for 2,000 lbs. delivered: Stove, egg, grate and chestnut, $5; for pea, $3.75. Bituminous coal in good request at nominally unchanged quotations. Manufacturers are all busy running their establishments to full capacity. Dealers anticipate a fairly remunerative fall and winter trade. Complaints of short supply of cars in the mining regions are heard occasionally but the supply here is adequate to all the requirements. Coke is steady with usual demand.

Lake freights continue dull at unchanged quotations. The quantity of coal shipped by lake westward from Buffalo, from October 1st to 7th, both days inclusive, was only 66,620 net tons, distributed about as follows: 34,940 to Chicago; 16,840 to Milwaukee; 6,200 to Duluth; 2,000 to Superior; 400 to Washburn, 400 to Detroit; 300 Saginaw; 700 to Escanaba; 1,200 to Racine, 1,300 to Toledo; 1,700 to Fort William, and 646 to Windsor. The rates of freight were 40c. to Chicago, Milwaukee and Escanaba; 50c. to Racine, 25c. to Washburn, Duluth and Superior; 20c. to Detroit and Toledo; 25c. to Windsor; 50c. to Fort William and 40c. to Saginaw. The receipts of coal by canal at this port for the first week in October were *nil.*; the shipments 903 net tons. Canal shipments for past month 10 loads of coal, viz.: 1 to Utica, 65c. net; 1 to New York, 90c. net; 3 to Syracuse, 55c. net and 4 to Syracuse, 65c. gross, all free on and off.

Work on the breakwater at this port has progressed very satisfactorily this season; the result of hard labor and judicious superintendence.

Mr. Thomas Edison, of Menlo Park, has completed plans to take power from Niagara Falls to Buffalo. He says "it is simply a commercial question, as there is no difficulty in the electrical part of it."

There passed westward through the Sault Ste. Marie Canal during the month of September 352,000 net tons of coal; total for season, 2,022,900 tons, as compared with 1,676,758 tons in 1890, and 1,222,465 tons in 1889.

Chicago. Oct. 8.

(From our Special Correspondent.)

There is a wide difference in the reports as to the status of the anthracite coal trade. Some agents of the various companies state that business is light, and that there is just as little doing as there was during the summer, and there are others who inform us that trade is good all along the line of wholesalers and retailers, with a greatly improved demand from outside country towns. From information and data at hand we are inclined to believe the latter statement to be the more incorrect of the two, though even that is rather florid. The continued cool weather is having a very stimulating effect on country business. Many new orders are received by mail, and a number of the trade were in town shopping around wholesalers and shippers, resulting in much new business. It was discovered, too, that prices are less irregular, though much of that is due to the scarcity of all-rail coal. Dock coal shows no change, but it is fully as low as it was a week or two ago. Most of the orders now being filled and going forward were booked a month ago. The continued scarcity of cars enables shippers to obtain fairly remunerative prices on any all-rail coal they have to sell, and values are getting close to circular rates. Some shippers are utilizing cattle cars on account of the shortage of box-cars. Stocks of hard coal are known to be light in those sections tributary to Chicago, and it is believed that a sudden change to cold weather would soon cause a depletion, and a scramble would ensue to replenish them. Vessel coal is coming forward more freely on account of the break in lake freights, and stocks are reported as being lighter at Buffalo than they usually are at this season.

Indiana block coal is in strong demand, and the poor car service makes it possible to obtain the full schedule price.

We know of one sale between shippers of 10 cars at plump circular rate, $2.40. Hocking Valley coal is also higher at $2.95, and in excellent demand. Manufacturing industries are also taking coal very freely, and many railroads are piling up supplies along the lines of their respective roads. Smithing coal is in good demand, and supply meagre.

Coke is in fair demand, but prices are less firm.

Prices of anthracite per ton of 2,000 pounds f. o. b. Chicago are: Lehigh lump, $6.75; large egg, $5; small egg, range, and chestnut, $5. Retail prices per ton are: Large egg, $5.75; small egg, range, and chestnut, $5.75.

Prices of bituminous per ton of 2,000 pounds f. o. b. Chicago are: Pittsburg, $3.25; Hocking Valley, $2.95; Youghiogheny, $3.40; Indiana block, $2.40; Illinois block, $1.90@$2.

Connellsville coke, 72-hour, per ton f. o. b. Chicago, $5.05; crushed, $4.75; Walston, $5; New River, $5; West Virginia, $4.25@$4.50.

Pittsburg. Oct. 8.

(From our Special Correspondent.)

So far as relates to the river miners the situation remains unchanged. Thus far they have demanded no advance; reports say they will demand four cents as soon as business opens in the fall. The only coal being mined just now is for local purposes. The empties have all been loaded and most of the mines closed until there are empties to load. The coal loaded and ready to leave the first rise amounts to 10,000,000 bushels. The railroad miners who signed an agreement, May 2d, for one year at 79 cents per ton, have struck for 13 cents per ton advance. Contracts have ceased to be binding. Coal men who made contracts that are not yet filled must pay the advance or stand a suit for damages; from this there is no escape. Five small firms that supply the local trade here have agreed to pay the advance. The mine owners who ship to the lakes are still firm, and operators say there is no sign of paying the price.

Connellsville Coke.—The coke trade has neither advanced or declined during the past week. There was a small boom in Eastern shipments, which brought the total output above the previous week's record, but production dropped a few points. Six

days continue to be the rule, though the exceptions are getting to be numerous. The long continued dry weather has seriously affected the water supply at some of the works. Cars are in good supply. There are 12,158 ovens in blast and 4,368 idle. Estimated production for the week is 118,015 tons. Week's shipments aggregated 6,887 cars, consigned as follows: To Pittsburg and river points, 1,990 cars; to points west of Pittsburg, 3,711 cars; to points east of Connellsville, 1,186 cars. Prices are as follows: Furnace coke, $1.90; foundry, $2.30; crushed, $2.65, f. o. b. cars at ovens. Some of the smaller dealers are shading prices a little in an effort to keep their works in full blast, but the prices are firmly maintained.

FREIGHTS

From Philadelphia to: Alexandria, 185c.; Baltimore, 100c.; Bangor, 70c.; Boston, 60@70c.; Charleston, 70c.; Gloucester, 75c.; Galveston, $2.25; Portland, 60c.; Portsmouth, 75c.; Salem, 60@65c.; Providence, 55@65c.; New York, 90c.; Washington, 185c.; Richmond, 70c.; Savannah, 40c.; New Orleans, $2.25.

†Alongside.

METAL MARKET.

NEW YORK, Friday Evening, Oct. 9.

Prices of Silver Per Ounce Troy.

Oct.	Sterling Exch'ge	Lond'n Pence.	N. Y. Cts.	Oct.	Sterling Exch'ge.	Lond'n Pence.	N. Y Cts.
3	4.83	45	97⅛	7	4 83	44⅝	96¾
5	4.83	44 11/16	97@96⅞	8	4.83	44⅝	96⅛
6	4.83	44 7/16	96⅝	9	4.83	44¾	96¾

Silver declined, owing to large offerings to our Government representing in part accumulations for the previous two weeks (our Government having been out of the market for that time.) Trade relations with India not being very active, there is very little demand for silver in that quarter, so that silver has not had the support from commercial quarters which might reasonably be expected at this period of the year.

The United States Assay Office at New York reports the total receipts of silver for the week to be 125,000 ounces.

Government Silver Purchases.

The Treasury Department informs us that the amount of silver purchased during the week was as follows:

	Offered, ozs.	Purchased, ozs.	Average price
Oct. 6	1,519,000	682,000	·9699
Oct. 7	775,000	625,000	·9691

WASHINGTON, D. C., October 9. [*By Telegraph.*]—The Treasury Department purchased 372,000 ounces of fine silver to-day at prices ranging from ·973 to ·97375.

Silver Bullion Certificates

	Price. H	L.	Sales.
Oct. 3	97⅛	97¼	200,000
Oct. 5	97	96⅝	247,000
Oct. 6	96¼	96⅛	30,000
Oct. 7	97	96⅝	85,000
Oct. 8	96¾	96⅝	44,000
Oct. 9	97⅛	97	180,000
Total sales			786.000

Domestic and Foreign Coin.

The following are the latest market quotations for American and other coin:

	Bid.	Asked.
Trade dollars	$ .76	$ .77
Mexican dollars	.76	.77
Peruvian soles and Chilian pesos	.71½	.72½
English silver	4.82	4.85
Five francs	.93	.95
Victoria sovereigns	4 83	4.86
Twenty francs	3.84	3.88
Twenty marks	4.74	4.76
Spanish doubloons	15.55	15 70
Spanish 25 pesetas	4.78	4.83
Mexican doubloons	15.50	15.70
Mexican 20 pesos	19 50	19.60
Ten guilders	3.96	4.00
Fine Silver Bars	.97⅝	.97¾

Copper.—Early in the week it became known that it was the intention to open the Anaconda mine by the 15th inst., and to resume operations in all departments. This news was evidently a surprise in London, and caused a sharp reaction, European buyers evidently fearing that the exports, which are going on at a very heavy rate from this country, would thus be materially increased. Consumption, which had been very good in Europe for some time past, has slackened somewhat during the last six or eight weeks, and thus the European market is evidently not prepared to take additional quantities. The market declined very fast, and on Wednesday business was done at £49 17s. 6d., the lowest price since April of last year. Later on it became known that the instructions to resume work at Anaconda had been countermanded, and this, we understand, on account of the railroads at the last minute declining to adjust the question of freight which has been pending so long. At the moment it is quite difficult to say, though as far as we can ascertain it would seem so, whether these later rumors are correct. The sharp decline in London reacted on our market here, and Lake Copper, which was quite firm at the end of last week at 12½c., is only nominal, and a few second-hand lots have been sold at the parity of about 12¼c., but at this price nothing is to be had from first hands, which, so far, remain quite firm.

Casting copper, which continues exceedingly scarce, is firmly held at about 11⅝@11½c., and it can hardly be supposed that a large decline will take place in this description of copper, as the demand is comparatively better for it just now than for the finer grades of copper. We understand that during the last few days prolonged meetings have taken place between some of the largest producers in this country, at which the owners of the Anaconda were also represented, but the result of their deliberations is not yet known.

As above mentioned, the London market, which went down on Wednesday afternoon to £49 17s. 6d., opened on Monday at £51 10s, but since Wednesday there has been a marked improvement, it having by that time become known that the opening of Anaconda had been deferred. Prices close at £50 15s.@£50 17s. 6d. for spot and £51 7s. 6s.@£51 10s. for three months, but the market is said to be very sensitive.

For manufactured we have to quote: English tough, £53@£55 10s.; best selected, $54 10s.@£55; strong sheets, £63@£64; India sheets, £59 10s.@£60; yellow metal sheets, 5¾d.

The exports of copper from the port of New York during the past week were as follows:

	Copper.	Lbs.	
To Antwerp—			
S. S. Westernland	58 casks. 340 bars.	113,696	$13,350
" "	198 pigs.	58,088	7,500
To Havre—	Copper.	Lbs.	
S. S. La Bourgogne	408 pigs.	120,147	$13,000
" "	205 plates.	10,118	1,500
" "	30 casks.	37,500	5,000
To Liverpool—	Copper Matte.	Lbs.	
S. S. Bothnia	1,50? bags	186,467	$13,250
" Etruria	250 bags	28,607	2,000
To Hamburg.—	Copper.	Lbs.	
S. S. Rugia	270 barrels.	337,500	$43,875
To Rotterdam—	Copper.	Lbs.	
S. S. Veendam	90 barrels.	102,500	$14,425

Tin.—Tin continues rather dull and depressed. Our market is again below the parity of the foreign, and business has taken place at 20·10c.@20·15c. for spot and near delivery tin. For metal to arrive hardly any business has been done as the parity of the Eastern markets is about 20·20c.@20·25c. laid down here. The article appears to be in a quite healthy position.

On the close we have to quote for spot 20¼c., October 20¼c., November and December 20@30c here, while London closes at £91 15s. @ £91 17s. 6d. for spot and £92 7s. 6d. @ £92 10s. for futures.

Lead.—Very little business has been done and offerings are scarce, but on the other hand consumers have almost entirely abstained from doing anything and had sales been pressed a decline would have been inevitable. As it is the article appears to continue exceedingly scarce in the West and large consumers out there absorbing nearly all the product of the smelters, and this gives great assistance to the market in general. The consumption must be called very good indeed, while most of the consumers have only small stocks and are regularly in the market. We quote for spot and October, 4·52½@4·55c.

The foreign market has been dull, Spanish being quoted at £12 2s. 6d. and English at £12 7s. 6d.

Chicago Lead Market.—Messrs. Everett & Post telegraph us as follows: "On the whole, the week just passed has been quiet. The inquiry for the most part has been confined to lead for spot or near-by deliveries. As for futures, consumers appear to be willing to take the chance of paying more for their lead when the time comes. The markes closes quiet but firm, at 4·35c.@4·37½c. asked."

St. Louis Lead Market.—The John Wahl Commission Company telegraphs us as follows: "Lead is steady at 4·35c., with light sales at that price. The demand at the close is not quite so good as it has been."

Spelter.—Spelter has been lifeless, and we quote nominally 5·05c.@5·10c.

The foreign market is somewhat lower, ordinaries being quoted at £23 12s. 6d. and specials at £23 17s. 6d.

Antimony.—Antimony has been in good consumptive demand and the higher prices now established have not prevented business. Offerings are very scarce, and we understand that almost all of the English makers are sold out up to the end of the year. Importers are holding back as their stocks are rather limited, and we have to raise quotations to 12½c. for Cookson's, 11¼c. for L. X., and 10⅝c. for Hallett's.

Quicksilver.—The quotations of £7 10s. and $43 continue to rule in London and New York respectively.

IRON MARKET REVIEW.

Locally there is no change to note in the iron market, and Western reports are to the effect that the demand is a shade better, due principally to the fact that large Western concerns are buying quite heavily at the prevailing low prices. This action does not stimulate prices, notwithstanding it shows an abiding faith in the future. When one-half of the market—the producer—refuses to contract for future delivery, and the remaining half—the consumer—refuses to buy ahead on the ground that he can do better later on, it would be folly to attempt to make a diagnosis of the situation. However, in a general way it can be said that prices, while no higher, are much firmer. That in certain quarters American pig is in good demand. That now more than ever, do the thinking members of the trade expect that the market, in consideration of general industrial conditions, will have an upward movement.

American Pig Iron.—The different brands are hardening in the face of a more general inquiry. There is a good demand for special makes. There is not as much pressure to sell Southern irons as was manifest a few weeks ago, owing, it is said, to the fact that the tonnage has been turned to the West. The general run of prices is unchanged as follows: Northern, No. 1 X $17@$18; No. 2 X, $16@$16.50. Southern, No. 1 X, $16.50@$17.50; No. 2 X, $15.50@$16.50.

Spiegeleisen and Ferro-Manganese.—It is reported that the foreign price has been advanced three shillings. Business is light. We continue to quote on 20% at $27.50@$28. On Ferro-manganese the nominal quotation is $64.50 tidewater. This figure can be shaded.

Steel Rails.—Affairs in this market partake of the general quietude. It is believed that the combine is once more in a harmonious working condition. The immediate demand is very light, and the disposition to contract ahead almost *nil*. Prices remain firm at $30 for standard sections at the mills and $30.75 tidewater.

Rail Fastenings.—There is manifest a shade of improvement. Prices are firm and unchanged as follows: Fish and angle plates, 1·75@1·80c.; spikes, 2·10@2·15c.; bolts and square nuts 2·75@2·80c.; hexagonal nuts, 2·80@2·85c.

Tubes and Pipes.—Demands fair. Discounts as follows said to be maintained: Butt, black, 57½%; butt, galvanized, 47½%; lap, black, 67½%; lap, galvanized, 55%; boiler tubes under 3 in., and over 6 in., 55%; 3 in. to 6 in., 60%.

Merchant Steel.—Their seems to be the one bright spot in the iron market. The demand is reported good, at prices which have ruled for some time. There is no disposition to cut. The future affords considerable promise. We quote: R. Mushet's special, 48c.; English, tool, 15c., net; American tool steel, 7@8c.; special grades, 13@20c.; crucible machinery steel, 4·75c.; crucible spring, 3¾c.; open-hearth machinery, 2·50c.; open-hearth spring, 2·50c.; tire steel, 2·50c.; toe calks, 2·50c.; first quality sheet, 10c.; second quality sheet, 8c.

Structural Iron and Steel.—There is no change in the market or prices. We quote: Universal plates, $2.20; bridge plates, $2 10; beams, $3.10.

Old Rails.—The stock is very light, with no pressure to sell and less inclination to buy. A good order would wipe out the available supply. We quote: $21@$22.50. Scrap is quiet at $20@$21.50.

Chicago. Oct. 8.

(From our Special Correspondent.)

There is a little more activity observable in railroad business and several large orders are coming forward for general equipment. Foundries are busy on orders for railroads, and the situation is generally improving. In the crude iron market the condition of demand and inquiry remains unchanged. Coke iron is going into consumption quite freely, but Lake Superior and Southern charcoal is not so active. The cooler weather throughout the West has had quite a stimulating effect upon trade generally. Machinery and machinists' tools, which have been exceedingly dull during the past few months, show a distinct revival, though by no means as active as it should be at this season. Merchant bar iron is in better demand than car iron just now, plates and galvanized slat iron active, but black sheet quiet. A good inquiry continues for structurals, and some small contracts are now being figured on. Orders for steel rails are numerous and for larger quantities. Old material and scrap do not show any improvement.

Pig Iron.—Consumers have bought quite freely of local coke iron during the week, one furnace alone having booked nearly 4,000 tons in lots of 500 to 800 tons. The new Iroquois furnace at South Chicago is giving satisfactory results, and is turning out a good class of iron. Prices are rather more steady than they have been and abstracts for deliveries extending beyond April, 1892, are not wanted excepting at an advance of 50c. to $1 per ton. There is every prospect of a shortage of iron ore at the lower lake ports, as shipments from mines are now restricted to actual contracts with furnace and higher prices for the non-Bessemer product are assured for the coming season. An improved inquiry is noted for charcoal iron, and though prices are no higher the low rates selling some time ago are not to be had, though several furnaces are still taking business at $17@$17.25. Chicago, Southern coke and soft irons are in fair demand, and prices still rule low, though some of the leading companies are making no concessions and limiting deliveries.

Quotations per gross ton f. o. b. Chicago are: Lake Superior charcoal, $17.25@$18; Lake Superior coke, No. 1, $15.25@$15.75; No. 2, $15@$15.25; No. 3, $14@$14.50; Lake Superior Bessemer,

$17; Lake Superior Scotch, $17@$17.50; American Scotch, $17.75@$18.25; Southern coke, Foundry No. 1, $15.75; No. 2, $15.25; No. 3, $14.50; Southern coke, soft, No. 1, $15.50; No. 2, $14.50; Ohio silveries, No. 1, $18; No. 2, $17; Ohio strong softeners, No. 1, $18; No. 2, $17; Tennessee charcoal, No. 1, $18; No. 2, $17.50; Southern standard car wheel, $21@$21.50.

Structural Iron and Steel.—There is a fair amount of work in sight, which is to be placed this season, but specifications appear to drag. Several good contracts were placed during the week. Quotations for car lots f. o. b. Chicago are as follows: Angles, $2@$2.10; tees, $2.60@$2.70; universal plates, $2.35@$2.45; sheared plates, $2.20@$2.30; beams and channels, $3.20.

Merchant Steel.—The week has been uneventful for miscellaneous steels. There is more buying from railroads, and we hear of purchases of steel by car builders, which foot up a good tonnage, and prices are fully maintained. A good demand continues for tool steel at $6.75@$7 and upward; tire steel, $2.30@$2.50; toe calk, $2.50@$2.65; Bessemer machinery, $2.20@$2.30; Bessemer bars, $2@$2.10; open-hearth machinery, $2.60@$2.75; open hearth spring, $2.75@$3; crucible spring, $3.75@$4.

Plates.—Dealers note a good fair trade from warehouse with a moderate sprinkling of mill orders, but business is not as large as was anticipated, and some mills quote low figures on steel plates. Steel sheets, 10 to 14, $2.70@$2.80; iron sheets, 10 to 14, $2.60@$2.70; tank iron or steel, $2.50@$2.70; shell iron or steel, $3@$3.25; firebox steel, $4.25@$5.50; flange steel, $3.25@$3.40; boiler rivets, $4.25; boiler tubes, 2¾ in. and smaller, 55%; 3 to 6 in., 60%; 7 in. and upward, 55%.

Steel Rails.—Several inquiries have been received for round quantities, part of which are for delivery this season and the remainder early next year. Demand is well sustained for small and medium sized lots, and an order for 1,500 tons for a Southern road was placed with our local steel mills. Quotations remain steady at $31.50@$33. Orders for splice bars, etc., are on a parity with those for rails. Regular quotations are: $1.95@$2 for steel and $1.85@$1.90 for iron; spikes at $2.20@$2.25 per 100 lbs.; track bolts, hexagonal nuts, $2.80.

Galvanized Sheet Iron.—At no time this year has the demand been so heavy as it is now. Mills are now crowded with work and deliveries slow. Discounts steady at 67½% off on Juniata and 67½% and 5% off on charcoal in small lots.

Black Sheet Iron.—Mill business is very light, but with the stimulus afforded by the cooler weather further orders are looked for before end of month. Mill prices are only fairly steady at 2·80@2·85c. for No. 27 common. Dealers quote 3·10@3·20c. for same gauge from stock, according to quantity.

Bar Iron.—More car orders are in sight, and demand for car iron in the very near future will be large. Much of the business at present is confined to small orders, jobbing, specifications, etc. Outside mills continue to make lower quotations than local makers, who name 1·77@1·80c., and valley mills 1·60c., but some are shading that price, and others are 50c. a ton higher. Dealers quote 1·80@1·90c. rates on small lots from store.

Nails.—There are very few Wheeling nails being sold to the jobbing trade here, the local and nearby mills monopolizing most of the business. Regular quotations are $1.65@$1.67½ on ordinary average. Jobbing price is $1.75 from stock in small lots. Wire nail makers at their convention here accomplished nothing, and mill price is still on the basis of $1.80, though larger orders for forward delivery are not wanted at those figures. Large dealers quote $2.10 from store.

Scrap.—There is no movement at all, that is of any moment. Stocks are large and prices nominal. Dealers quote: No. 1 railroad, $19; No. 1 forge, $18.50; No. 1 mill, $14; fish plates, $22.50; axles, $23; horseshoes, $18.50; pipes and flues, $11; cast borings, $7.50; wrought turnings, $9.50; axle turnings, $12.50; machinery castings, $12; stove plates, $7.50; mixed steel, $11; coil steel, $14.50; leaf steel, $15.50; tires, $15.50.

Old Rails and Wheels.—There is no demand for iron or steel rails; offerings are large and in the absence of sales prices are entirely nominal. Iron rails are $22.25; steel rails, $14@$16, as to length, and car wheels are in some inquiry at prices lower than holders will accept. They are quoted at $16.

Cleveland. Oct. 8.

(From our Special Correspondent.)

The iron ore market is in about the same condition it has been. There have been some inquiries, however, from furnace men for small amounts but little business has resulted, save the sales of a small lot of non-Bessemers to go east of the Alleghenies at $3.75@$4.00 per gross ton at Buffalo, and sales aggregating about 150,000 tons to several large consumers who have purchased somewhat beyond their needs, because they no doubt feel that bed-rock has been reached and that the future is pretty sure to bring enhanced prices all along the line by the spring of 1892.

Grain freights have taken another slump, and the situation may be diagnosed as follows, viz.: The amount of ore yet to come down to fill sales is comparatively small and shippers consequently have only a moderate interest in the freight market; then owing to the plethora of vessels at Chicago and at the head of the Lakes attracted by grain, the tonnage wanted for that trade has been pretty well taken up and a drop follows; this in turn leads them to look for ore to carry, only to be met with the bear argument of reduced grain rates.

Lake freights on ore then may be quoted at 85 cents from Escanaba, with some charters made at 80 cents, $1 for Marquette, with no quotations for Ashland.

Quotations remain nominally as follows:

SPECULAR AND MAGNETIC ORES.

Bessemer	66@69	$5.25@	$6.00
"	60@64	4.25@	5.00
Non-Bessemer	66@69	4.50@	4.75
"	57@60	2.75@	3.75

SOFT HEMATITES, DRIED AT 212°.

Bessemer	62@65	$4.00@	$4.50
"	58@61	3.50@	4.00
Non-Bessemer	55@63	2.75@	3.25

Above prices are for delivery at Lake Erie ports.

Louisville. Oct. 7.

(Special Report by HALL BROTHERS & CO.)

There is nothing especially new to report concerning the iron market. It has ruled quiet. Transactions have been in comparatively light quantities, and prices run about the same. Inquiries have been mostly for delivery beginning in 1892 and running several months, which in some instances have been met, but in most cases furnaces prefer not to make such extended engagements.

Hot Blast Foundry Irons.—Southern coke, No. 1, $14.25@$14.50; No. 2, $13.50@$14; No. 3, $13@$13.25. Southern charcoal, No. 1, $16@$17; No. 2, $15.50@$16. Missouri charcoal, No. 1, $17@$17.50; No. 2, $16.50@$17.

Forge Irons.—Neutral coke, $12.50@$12.75; cold short, $12.25@$12.50; mottled, $11.75@$12.

Car Wheel and Malleable Irons.—Southern, standard brands, $19@$19.50; Southern, other brands, $17@$18. Lake Superior, $20@$21.

Philadelphia. Oct. 9.

(From our Special Correspondent.)

Pig Iron.—The iron men do not look for any widespread improvement until the rail mills start up—a very remote contingency. As long as no new factor is to be taken into account, forge and foundry iron will creep along about where they are. The recent activity in irons did not harden prices in the least, except in a few special brands. Best No. 1 is $18@$18.25, though good iron can be had at $17.50. No. 2 is going fairly well at $16@$16.50. Several large buyers are trying to get the best iron in the market at $16.25. Forge orders for 1,000-ton lots cannot be placed for good material under $14.50, though $15 is quoted on some brands and makers say they will not take any less. There is considerable stir in Bessemer, and talk of big sales near at hand.

Ferro-Manganese.—Sales at $63.50.

Steel Billets and Slabs.—Several large sales were made early in the week between $27 and $27.50 at tidewater points. Rumors are current of offers at $27 that are likely to be taken. The mills are filling up.

Muck Bars.—Nearly all the new business consists of small lots. Makers counted with confidence on a big order this week, but buyers still hold off.

Merchant Iron.—It is impossible to gather any solid news about merchant bars. Some mills are doing a big business for forward delivery, but there are more that are hardly able to keep running. A good deal of iron is going at $1.60.

Nails.—A moderate business is being done by retailers at the lowest price of the season.

Skelp.—But little business, and no change in prices.

Wrought Iron Pipe.—Prices are unstable under an uncertain demand.

Sheet Iron.—Sharp competition continues on winter business despite the fact that margins in September were almost wiped out on large orders. Mills are quite full of business, but it is not very profitable.

Plate and Tank.—Steel tank is selling on a 2 cent basis and orders have been quite satisfactory. Refined steel plate, in some cases, has also done well at $2.15. The situation is not improving but hopes are entertained of better conditions at an early day.

Structural Material.—The difficulty in the way of placing large orders can not be easily removed by the efforts of manufacturers. The lowest possible prices have been named, yet large requirements are kept back and only enough material ordered to keep things going. Angles, $2@$2.05; Sheared plates, 2c.; Tees, 2½c., and beams and channels, $3.10.

Steel Rails.—The sales of the week were 22,000 tons, $30 at mill.

Old Rails.—All the old iron rails that can be had are quoted at $21.50@$22.50. Old Steel Rails, $17.50.

Scrap.—Sales have been made at $21@$21.50.

Pittsburg. Oct. 8.

(From our Special Correspondent.)

Business during the week has not been of a very satisfactory nature to the seller. In order to effect sales in several instances shading prices was the rule not the exception, notwithstanding the fact that pig iron in this market is selling at lower prices than in any other market. This is not generally the situation. There is a good deal of business doing of various kinds but prices are irregular, feverish and very uncertain. Confidence in the market is far from being restored; until that is accomplished all predictions in regard to improved prices for iron and steel will fail to materialize. At present no one is willing to venture an opinion on the future. One thing is very certain—there must be a change one way or another. It is out of the question for the trade to continue in its present condition much longer.

Most of the City furnaces are well sold up and are not anxious to make further contracts at prevailing figures. The situation in the East is thus described by a leading "Iron man": A large business has been done during the past two weeks, and trade is still abundant at prices recently ruling. Sellers are trying to secure better prices, and in some instances have succeeded in doing so for deliveries during the first quarter of the coming year, but for 1891 it is hard to secure any clearly defined advance. Practically sellers are getting more money. Concessions that were almost unavoidable a little while ago are now completely done away with.

The supply of iron is very large, and while the demand is equally so, if general appearances are a safe criterion, better prices are not very far distant. Several brands, both local and Southern, are held for an advance on previous prices, which shows that order books are pretty well filled. It is seldom that sellers begin to talk higher prices until they have about all the business they can handle."

Reports from the Shenango and Mahoning valleys are rather conflicting; furnace men do not hold the same opinion in regard to values. At the same time sales of pig in the valleys are fully abreast with those that govern the Pittsburg market. Freights to Pittsburg are 70 cts. per ton; at the same time there is a good deal of iron from those districts that finds a market here.

New steel rails are steady at ruling rates; a rumor was current that a sale of 50,000 tons had been made to a foreign country; the figures could not be learned. Scrap material continues firm and inquired for, particularly No. 1 R. R. Other descriptions command fair prices. Old iron and steel rails held firmly at current rates; the former is very scarce and will soon be numbered with things of the past, as steel has taken the place of iron in the manufacture of rails.

Steel Billets.—The sales for some time past have been unusually large; prices weaker, but show no quotable change. Muck bar, sales, early delivery, at previous prices.

Coke and Coal Smelted Lake and Native Ores		
4,500 Tons	Grey Forge, City Furnace	$13.85 cash.
2,800 Tons	Bessemer, Nov., Dec	15.50 cash.
2,500 Tons	Grey Forge, City Furnace	13.75 cash.
2,500 Tons	Bessemer, Oct., Nov	15.45 cash.
2,000 Tons	Grey Forge, Nov., Dec	13.80 cash.
1,500 Tons	Bessemer, Oct., Nov	15.00 cash.
1,000 Tons	Grey Forge, City Furnace	13.85 cash.
1,000 Tons	Bessemer, Oct., Nov	15.40 cash.
1,000 Tons	Grey Forge	13.85 cash.
1,000 Tons	Grey Forge	13.85 cash.
1,000 Tons	Grey Forge	13.85 cash.
200 Tons	No. 1 Foundry, all ore	17.00 4m.
200 Tons	No. 1 Foundry, all ore	16.75 cash.
150 Tons	No. 2 Foundry, all ore	16.00 4m.
100 Tons	No. 2 Foundry, Southern	14.75 cash.
100 Tons	No. 2 Foundry, City Furnace	15.50 cash.
100 Tons	No. 2 Siling	16.00 cash.
75 Tons	No. 2 Foundry	15.25 cash.
50 Tons	Grey Forge	13.90 cash.
Charcoal.		
125 Tons	Cold Blast	26.00 cash.
100 Tons	No. 2 Foundry	20.50 cash.
100 Tons	No. 1 Foundry	22.00 cash.
Steel Slabs and Billets.		
2,500 Tons	Billets and Slabs, Oct. Nov	24.70 cash.
1,500 Tons	Billets, Oct., Nov., Dec	24.75 cash.
1,000 Tons	Billets	25.00 cash.
1,000 Tons	Billets	25.00 cash.
500 Tons	Billets	25.00 cash.
Muck Bar.		
1,500 Tons	Neutral, Oct	26.50 cash.
10,00 Tons	Neutral, Oct., Nov	26.75 cash.
1,000 Tons	Neutral, Nov., Dec	26.50 cash.
500 Tons	Neutral	26.50 cash
500 Tons	Neutral	26.25 cash.
Ferro-Manganese.		
100 Tons	80%, domestic	66.50 cash.
25 Tons	80%, "	66.50 cash.
Old Iron and Steel Rails.		
400 Tons	American Ts	23.70 cash.
400 Tons	American Ts	23.75 cash.
350 Tons	Steel, short pieces	17.00 cash.
200 Tons	Steel, long pieces	18.25 cash.
Skelp Iron		
1,400 Tons	Sheared	1.95 4 m.
1,000 Tons	Wide Grooved	1.75 4 m.
1,000 Tons	Narrow Grooved	1.72½ 4 m.
Steel Wire Rods.		
750 Tons	American Fives	34.50 cash.
Bloom, Beam, Rail and C Ends.		
1,200 Tons	Bloom and Rail Ends	17.00 cash.
900 Tons	Beam Ends	17.00 cash.
Scrap Material.		
200 Tons	No. 1 R. R. Wrought Scrap, net	20.25 cash.
200 Tons	Leaf Steel, gross	22.40 cash.
100 Tons	Iron Axles, net	25,00 cash.

NEW YORK MINING STOCKS QUOTATIONS.

DIVIDEND-PAYING MINES.

Name and Location of Company.	Oct. 3.		Oct. 5.		Oct. 6.		Oct. 7.		Oct. 8.		Oct. 9.		Sales.
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Adams, Colo.													
Alice, Mont.													
Argenta													
Atlantic, Mich.													
Belcher, Nev.													
Belle Isle, Nev.													
Bodie Cons., Cal.									.45				400
Bos. & Mont., Mont													
Breece, Colo.			50										500
Bulwer, Cal.													
Caledonia, S. Dak.													
Catalpa													
Chrysolite, Colo.													
Colorado Central, Colo.													
Commonwealth, Nev.							.35						200
Comstock T. bonds, Nev.							.32	.31					2,000
" scrip., Nev.													
Cons. Cal. & Va., Nev.					5.50	5.38	5.63						232
Crown Point, Nev.	1.40		1.50				1.60				1 60		550
Deadwood, Dak.									2.00				100
Eureka Cons., Nev.													
Father de Smet, S. Dak.													
Franklin, Mich.													
Freeland, Colo.	.12	.10	.12	.11	.12	.10	.12	.10	.12	.11	.12	.11	21,400
Gould & Curry, Nev.	1.95								2.05		2.00		325
Granite Mountain, Mont.													
Hale & Norcross, Nev.	1.50										1.65		200
Homestake, Dak.													
Horn Silver, Utah							3.40	3.39	3 50	3.40			300
Independence, Nev.													
Iron Hill					.20								100
Iron Silver			1.40						1.40	1.39			1,000
Leadville Cons., Colo.			.12										500
Little Chief, Colo.													
Martin White, Nev.											1 35		300
Mono, Cal.			.10										500
Mt. Diablo, Nev.													
Navajo, Nev.													
N. Belle Isle, Nev.													
Ontario, Utah													
Ophir, Nev.	3.55		3.50				3.75		4.10		3.95		450
Osceola, Mich.													
Plymouth, Cal.													
Quicksilver, Pref., Cal.													
" Com., Cal.													
Quincy, Mich.													
Robinson Cons., Colo.					.40								100
Savage, Nev.	3 20				2.75				3.00				230
Sierra Nevada, Nev.	2.50						2.50		2.65		2.60		350
Silver Cord, Colo.											.20		200
Silver King, Ariz.													
Silver Mg. of L. V., N.M.													
Small Hopes, Colo.													
Standard	1.45	1.40	1.10		1.45				1.45				1,000
Yellow Jacket, Nev.	1.60		1.65				1.75		1.50		1 80		500

NON-DIVIDEND-PAYING MINES.

Name and Location of Company.	Oct. 3.		Oct. 5.		Oct. 6.		Oct. 7.		Oct. 8.		Oct. 9.		Sales
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Alpha, Nev.													
Alta	.54		.55				.50		.55		.53		853
American Flag, Colo.													
Andes, Cal.													
Astoria, Cal.													
Augusta, Ga.													
" bonds													
Barcelona, Nev	.07												200
Belmont, Cal.	.90		.90		.90		.90		.90		.90		1,500
Best & Belcher, Nev.			2.75		2 95		2.85		3.35		3.20		500
Bonanza King, Cal.													
Brunswick, Cal.			.08		.18		.08		.08		*.12		1,800
Bullion, Nev.													
Butte & Bost., Mont.													
Castle Creek, Idaho													
Chollar	1.55		1 50				1.45		1.65		1.55		500
Comstock T., Nev.			.18		.18		.19	.18	.19		.20	.18	11,000
Con. Imperial, Nev.													
Con. Pacific, Cal.													
Crescent, Colo.													
Del Monte, Nev.													
El Cristo, Rep. of Col.	.60	.57					.60						400
Emmett													
Exchequer, Nev.													
Hollywood, Cal.													
Huron, Mich.													
Julia													
King & Pembroke, Ont.													
Lacrosse, Colo.													
Lee Basin, Colo.													
Mexican, Nev.	2.45		2.50		2.40	2.25					2.80		620
Middle Bar, Cal.	.02												1,500
Monitor, Colo.													
Mutual S.& M.Co., Wash.					.60								200
Nevada Queen, Nev.													
N. Standard, Cal.													
N. Commonwealth, Nev.													
Occidental, Nev.							.85						500
Overman													
Phœnix Lead, Colo.													
Phœnix of Ariz.	.53	.50	.53	.62	.53	.50					.43		5,600
Potosi, Colo.	2.50						2.50				1.75		250
Rappahannock, Va.													
S. Sebastian, S. Sal.													
Santa Fe, N. M.													
Scorpion, Nev.													
Seg Belcher, Nev.													
Shoshone, Idaho													
Silver Queen					.02								200
Sullivan Con., Dak.													
Sutro Tunnel, Nev.													
Syndicate													
Tornado Con., Nev.													
Union Cons., Nev.	2.50												200
Utah, Nev.	55		.65				60		.75		75		1,100

*Ex. dividend. †Dealt in in the New York Stock Ex. Unlisted securities. ‡Assessment paid. §Assessment unpaid. Dividend shares sold, 31,537. Non-dividend shares sold, 26,923.
Total shares sold 58,460.

BOSTON MINING STOCK QUOTATIONS.

Name of Company.	Oct. 2.		Oct. 3.		Oct. 5.		Oct. 6.		Oct. 7.		Oct. 8.		Sales.
Atlantic, Mich.					14.50								25
Bodie, Cal.													
Bonanza Development													
Bost. & Mont., Mont.	46.50	45.00			47.50	46.87	47.00	45.00	46.25	46.00	46.00	45.25	1,924
Breece, Colo.	.50		.50										700
Calumet & Hecla, Mich.	270		269				265		265		265		22
Catalpa, Colo.													
Central, Mich.													
Cœur d'Alene, Id.													
Con. Cal. & Va., Nev.													
Dunkin, Colo.													
Eureka, Nev.													
Franklin, Mich.	17.50	17.00			17.25		17.50		17.37		17.00		740
Honorine, Utah													
Horn Silver, Utah													
Kearsarge Mich.	15.00	14.75	15.50		16.00		16.00	15.87	15.50				327
Little Chief, Colo.													
Little Pittsburg, Colo.													
Minnesota Iron.													
Napa, Cal.													
Ontario, Utah													
Osceola, Mich.	38.00	37.00	37.75	37.50	37.50	37.00	37.50	37.00	37.00				382
Quincy, Mich.													
Ridge, Mich.													
Sierra Nevada, Nev.													
Silver King, Ariz.													
Stormont, Utah													
Tamarack, Mich.	174						178	177			177		56
Tecumseh, Mich.													

Name of Company.	Oct. 2.		Oct. 3.		Oct. 5.		Oct. 6.		Oct. 7.		Oct. 8.		Sales
Allouez, Mich.	1.75		1.75						1.75	1.50			1,725
Arnold, Mich.	2.00												50
Aztec, Mich.													
Brunswick, Cal.													
Butte & Boston, Mont.	18.00	16.75	18.25		18.50				17.75	17.25	17.25		1,025
Centennial, Mich.					17.00				16.00		15.00		310
Comstock, T., Nev.													
Copper Falls, Mich.													
Crescent, Colo.													
Dana, Mich.													
Don Enrique, N. M.													
El Cristo, S. A.													
Hanover, Mich.													
Humboldt, Mich.													
Hungarian, Mich.													
Huron, Mich.							.40				.35	.25	640
Mesnard, Mich.													
National, Mich.													
Native, Mich.													
Oriental & M., Nev.													
Phoenix, Ariz.													
Pontiac, Mich.													
Rappahannock, Va.													
Santa Fe, N. Mex.							47⅞	.45			42½	.40	47½	2,150
Shoshone, Idaho													
South Side, Mich.													
Star, Mich													
Washington, Mich.													
Wolverine	5.25		5.50	5.25	5.75	5.50			5.37				1,600

Dividend shares sold, 4,176. Non-dividend shares sold, 7,500. Total shares sold, 11,676.

COAL STOCKS.

Name of Company.	Oct. 3.		Oct. 5.		Oct. 6.		Oct. 7.		Oct. 8.		Oct. 9.		Sales.
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
American Coal.													
Cambria Iron.													
Cameron Coal & I. Co.													
Ches. & O. R. R.													
Chic. & Ind. Coal R. R.													
Do. pref.													
Col. C. & I.	37⅞	37	38¾	37¾	39⅛	38⅛	38⅛	38	38⅛	38	38		16,905
Col. C. & Hocking C. I.			16¾		16¾								200
Consolidation Coal.													
Del. & H. C.	136½	133¾	136¾	136	135				135		135½	135¼	1,496
D., L. & W. R. R.	142½	141¾	143⅝	142½	142⅝	141¾	142	141½	142	141⅝	142⅝	141½	16,018
Hocking Valley							33⅞	33	33¼	32¾	33¼	31⅝	23,835
Hunt & Broad Top.	26	25¾	26										225
Do. pref.	47⅜		47¾	47⅜	47⅜								151
Illinois C. & Coke Co.													
Lehigh C. & N.	49¼		49⅛		49⅝	49⅛	49¾	49⅝					154
Lehigh Valley R. R.	51		51¾	51	51		51	50¾	51	50⅝			1,056
Lehigh & Wilk. Coal.													
Mahoning Coal.													
Do. pref.													
Maryland Coal.													
Morris & Essex.							143¼	143	143⅛				270
New Central Coal.			12⅛										100
N. J. C. R. R.	119¼	118¾	120¾	119¾	119⅝				118¾		119⅛		2,209
N. Y. & S. Coal.													
N. Y., Susq. & West.	11	10⅝	11⅛	10⅞	11⅛	11	10¾		10⅝	10	10¾	10⅝	5,372
Do. pref.	40⅜	40	41¼	40¾	40¾	40¼	40	39¼	39½	39¼	4 1 4	39¾	6,798
N. Y. & Perry C. & I.							53½		5				400
Norfolk & West. R. R.			18¾	18	18¼	18¼	18½		18		18½		745
Do. pref.			56¾	55½	56¼	55½							1,891
Penn. Coal.													
Penn. R. R.	54¾	54⅛	55⅛	54¾	54¾	54⅛	54¾	54¾	54¾	54⅛			3,081
††Ph. & R. R. R.	41½	40¾	42⅝	41½	41¾	40⅝	41½	40⅝	41	40⅜	41½	40¼	70,390
Sunday Creek Coal.													
Do. Pref.													
Tennessee C. & I. Co.	37⅜	36¾	38¾	37½	41¼	39¼	41¼	39½	40¾	39	40¼	39½	16,730
Do. pref.					89		90						210
Westmoreland Coal.													

Total shares sold, 168,036.

San Francisco Mining Stock Quotations.

Names of Stocks.	Closing Quotations. Oct. 2.	Oct. 3.	Oct. 5.	Oct. 6.	Oct. 7.	Oct. 8.
Alpha	.45	.45	.40	.40	.45	.45
Alta						
Belcher	.45	.40	.40	.45	.45	
Belle Isle	1.60	2.60	2.70	2.80	3.20	3.00
Best & Belcher	.40	.40	.40	.40	.45	.50
Bodie	.15			.15	.15	.20
Bulwer	1.40	1.35	1.30	1.30	1.50	1.40
Chollar	.25	.25				
Commonwealth	5.50	5.50	5.62	5.87½	6 8⅞	6.12½
Cons. Cal. & Va.						
Cons. Pacific	1.25	1.35	1.35	1.45	1.55	1.45
Crown Point					.10	
Del Monte, Nev.						
Eureka C	1.85	1.70	1.80	1.80	1.90	1.85
Gould & C.	1.35	1.50	1.40	1.40	1.55	1.50
Hale & Norcross						
M. White	2.30	2.35	2.35	2.55	2.70	2.65
Mexican	.10	.10	.15	.15	.15	.20
Mono						
Mt. Diablo			.05		.10	
Navajo						.10
Nev. Queen	.25	.25		.35	.30	
N. Belle Isle						
N. Commonwealth	3.40	3.30	3.50	3.55	3.90	3.75
Ophir	2.30	2.30	2.30	2.30	2.60	2.55
Potosi	3.00	2.95	2.95	2.80	2.90	2.85
Savage	2.35	2.30	2.35	2.35	2.50	2.45
Sierra Nev.	2.35	2.25	2.30	2.30	2.50	2.45
Union Con.	.45	.50	.50	.50	.60	.65
Utah	1.45	1.50	1.50	1.60	1.75	
Yellow Jack						

DIVIDEND-PAYING MINES.

	Name and Location of Company.		Capital Stock.	Shares. No.	Par	Assessments. Total levied.	Date and Amount of last			Dividends. Total paid.	Date & amount of last.		
1	Adams, s. L. C.	Colo.	$1,500,000	150,000	$10	*				$600,000	Aug.	1891	.05
2	Alice, s.	Mont.	10,000,000	400,000	25	*				945,000	Aug.	1891	.06½
3	Alma &Nel Wood., G	Idaho	300,000	30,000	10	*				60,000	Jan.	1889	50
4	Amador, G.	Cal.	1,250,000	250,000	5	*				31,250	Aug.	1890	.12½
5	American Belle,s.d.c	Colo.	2,000,000	400,000	5	*				50,000	April	1891	.12½
6	Americ'n&Nettie,G.&S	Colo.		300,000						150,000	Nov.	1889	10
7	Amy & Silversmith, s.	Mont.		341,419						247,530	Aug.	1887	.12½
8	Atlantic, c.	Mich.	1,000,000	40,000	25	$280,000	April	1875	$1.00	700,000	Feb.	1891	1.00
9	Argenta, s.	Nev.	10,000,000	100,000	100	335,000	July.	1889	.10	40,000	Feb.	1880	.20
10	Aspen Mg. & S., s. L.	Colo.	2,000,000	200,000	10	*				660,000	May.	1891	.10
11	Aurora, I.	Mich.	2,500,000	100,000	25					55,000	April	1891	1.00
12	Badger, s.	Ont.	250,000	50,000	5	*				37,500	Mar.	1890	.25
13	Bangkok Cora-Bell,s.	Colo.	600,000	600,000	1	*				44,510	Aug.	1890	.00¾
14	Belle Isle, s.	Nev.	10,000,000	100,000	100	190,000	Dec.	1889	.15	300,000	Dec.	1879	.25
15	Belcher, S. G.	Nev.	10,400,000	104,000	100	2,978,000	Feb,	1891	.50	15,397,000	April	1876	1.00
16	Bellevue, Idaho, s. L.	Idaho	1,250,000	125,000	10	120,000	Dec.	1889	.25	200,000	Jan.	1890	.10
17	Bi-Metallic, s. G.	Mont.	5,000,000	200,000	25					780,000	June	1891	.35
18	Bodie Con., G. I.	Cal.	10,000,000	100,000	100	550,000	June	1890	.25	1,602,572	April	1885	50
19	Boston & Mont., G.	Mont.	2,500,000	250,000	10	*				520,000	June	1886	.15
20	Boston & Mont., C. S.	Mont.	2,500,000	100,000	25	*				1,95),000	Aug.	1891	1.00
21	Breece, I.	Colo.	5,000,000	200,000	25					2,000	Feb.	1880	.01
22	Brooklyn Lead, L. S.	Utah	500,000	50,000	10					127,000	July.	1887	05
23	Bulwer, G.	Cal.	10,000,000	100,000	10	130,000	Aug.	1889	.25	175,000	Jan.	1884	.10
24	Bunker Hill & S.S.L.	Idaho	3,000,000	300,000	10	*				150,000	Oct.	1883	.00⅔
25	Caledonia, G.	Colo.	10,000,000	100,000	100	505,000	May	1885	.15	192,000	Oct.	1890	.08
26	Calliope, s.	Colo.	1,000,000	1,000,000						140,000	Jan.	1891	.00¾
27	Calumet & Hecla C.	Mich.	2,500,000	100,000	25	1,200,000				36,350,000	Sept	1891	5 00
28	Catalpa, s. L. I.	Colo.	3,000,000	300,000	10	*				270,000	May	1884	10
29	Centen'l-Eureka, s.L.	Utah	1,500,000	30,000	50					352,5)0	July.	1891	2.00
30	Central, C.	Mich.	500,000	20,000	25	100,000	Oct.	1861	.65	1,970,000	Feb.	1891	1.00
31	Chrysolite, s.	Colo.	10,000,000	200,000	50	*				1,650,000	Dec	1884	.25
32	Clay County, G.	Colo.	200,000	200,000	1	*				40,000	July.	1891	.02
33	Coeur D'Alene, s. L.	Idaho	5,000,000	500,000	10					290,000	Oct.	1891	.02
34	Colorado Central, s.L.	Colo.	2,750,000	275,000	10	*				406,25)	Aug.	1889	.05
35	Commonwealth, s.	Nev	10,000,000	100,000	100	179,000	Nov.	1888	.50	20,000	Nov.	1890	.20
36	Confidence, s. L.	Nev.		24,390		328,880	May	1890	.75	199,500	April	1890	8.00
37	Cons. Cal. & Va., s.G.	Nev.	21,600,000	216,000	100	108,000	Jan.	1885	.20	3,682,800	Aug	1891	.50
38	Contention, s.	Ariz.	12,580,000	250,000	50					‡2,587,500	Dec.	1884	.25
39	**Cop. Queen Con., C.	Ariz.	1,400,000	140,000	10					210,000	Feb.	1889	.50
40	Cortez, s.	Nev.	1,500,000	300,000	05	*				481,000	Feb.	1891	.46
41	Crescent, s. L. G.	Utah	15,000,000	600,000	25	*				228,000	Oct.	1888	.03
42	Crown Point, G. s.	Nev.	10,000,000	100,000	100	2,425,000	Sept.	1889	.50	11,598,000	Jan.	1875	2.00
43	Cumberland, L. S.	Mont.	5,000,000	500,000	10	*				15,000	Nov	1889	.03
44	Daly, s. L.	Utah	3,000,000	150,000	20					2,062,500	Aug.	1891	.25
45	Deer Creek, s. G.	Idaho	1,000,000	200,000	5	*				20,000	June	1889	.05
46	Deadwood-Terra, G.	Dak.	5,000,000	200,000	25	*				1,020,000	Sept.	1891	.05
47	DeLamar, s. G.	Idaho	2,000,000	400,000	5					72,000	July.	1891	.13
48	Derbec B. Grav., G.	Cal.	10,000,000	100,000	100	90,000	Dec.	1881	.10	240,000	Oct.	1891	.10
49	Dunkin, s. L.	Colo.	5,000,000	200,000	25	*				390,000	Oct.	1889	.05
50	Dunstone, G. S. L.	Mont.	1,000,000	200,000	5	*				6,000	Nov.	1888	.03
51	Eclipse, L. S.	Colo.	100,000	100,000	1					20,000	Nov.	1887	10
52	Elkhorn, s. L.	Mont.	1,000,000	200,000	5	*				¶396,000	June	1891	1.00
53	Enterprise, s.	Colo.	100,000	10,000	10	*				40,000	May.	1888	1.00
54	Eureka Con., s. L. G.	Nev.	5,000,000	50,000	100	550,000	June	1889	.50	4,992,500	Oct.	1890	.25
55	Evening Star, s. L.	Colo.	500,000	50,000	10	*				1,450,000	Dec.	1889	.25
56	Father de Smet, G.	Dak.	10,000,000	100,000	100	200,000	Nov.	1878	1.00	1,125,000	Dec.	1885	.20
57	Franklin, C.	Mich.	1,000,000	40,000	25	220,000	June	1871		‖1,040,000	July.	1891	2.00
58	Freeland, s. G.	Colo.	5,000,000	200,000	25	*				190,000	July.	1886	.10
59	Garfield Lt., G. S.	Nev.	500,000	100,000	5					90,000	April	1888	.12½
60	Gould & Curry, s. G.	Nev.	10,000,000	108,000	100	3,388,800	Sept.	1890	.25	3,826,800	Oct.	1870	10.00
61	Grand Prize, s.	Nev.	10,000,000	100,000	100	785,000	Jan.	1890	.30	495,000	Mar.	1884	.25
62	Granite, s. L.	Idaho	500,000	500,000	1					28,400	Oct.	1889	.02
63	Granite Mountain, s.	Mont.	10,000,000	400,000	25					11,300,000	Sept.	1891	.25
64	Green Mountain, G.	Cal.	1,250,000	125,000	10	*				212,000	Nov.	1881	.07½
65	Hale & Norcross, G. S.	Nev.	11,200,000	112,000	100	5,142,800	April	1890	.50	1,822,000	Aug.	1888	.50
66	Hecla Con., s. G. L. C.	Mont.	1,500,000	30,000	50					1,680,000	Aug.	1891	.50
67	Hel'a Mg.& Red,s.L.G.	Mont.	3,315,000	663,000	5	*				197,970	July.	1886	.06
68	Holmes, s.	Nev.	10,000,000	100,000	100	370,000	May	1890	.25	75,000	April	1886	.25
69	Homestake, G.	Dak.	12,500,000	125,000	100	200,000	July.	1878	1.00	4,731,750	Aug.,	1891	.10
70	Honorine, s. L.	Utah	500,000	250,000	2	37,500	April	1889	.05	125,000	Sept.	1887	.05
71	Hope, s.	Mont.	1,000,000	100,000	10	*				233,252	April	1888	.25
72	Horn-Silver, s. L.	Utah	10,000,000	400,000	25	*				4,340,000	June.	1891	.12½
73	Hubert, G.	Colo.	1,000,000	1,000,000						247,000	Dec.	1889	.00¾
74	Idaho, G.	Cal.	310,000	3,100	100	*				2,303,75)	July.	1891	3.00
75	Illinois, s.	N. M.	100,000	100,000	1	*				45,000	April	1889	.20
76	Iron Hill, s.	Dak.	2,500,000	250,000	10	134,000	July.	1889	.08	156,250	Nov.	1887	.07½
77	Iron Mountain, S.	Mont.	500,000	500,000	1	*				120,000	Feb.	1891	.05
78	Iron-Silver, s. L.	Colo.	10,000,000	500,000	20					2,500,000	April	1889	.20
79	Jackson, G. s.	Nev.	5,000,000	50,000	100	237,500	Nov.	1880	.20	60,000	Jan.	1891	.10
80	Jay Gould, G. S.	Mont.	2,000,000	40,000	5	*				459,000	May	1890	.04
81	Kearsarge, C.	Mich.	1,000,000	40,000	25	190,000	Oct.	1887	1.00	80,000	Jan.	1890	2.00
82	Kentuck, s. G.	Nev.	3,000,000	30,000	100	417,430	Dec.	1890	.35	1,350,000	Dec.	1886	.10
83	La Plata, s. L.	Colo.	2,000,000	200,000	10	*				610,000	Sept.	1882	.30
84	Leadville Con., s. L.	Colo.	4,000,000	400,000	10	*				423,000	April	1887	.05
85	Lexington, G. s.	Mich.	4,000,000	40,000	100	*				565,000	Jan.	1885	2.00
86	Little Chief, s. L.	Colo.	10,000,000	200,000	50	*				820,000	Dec.	1890	.05
87	Little Rule, s.	Colo.	500,000	500,000	1					170,000	July.	1891	.02
88	Mammoth, s. L. C.	Utah	10,000,000	400,000	250	110,000		1882	.25	960,000	June	1891	.10
89	Martin White, s.	Nev.	10,000,000	100,000	100	1,225,000	Oct.	1890	.25	140,000	Dec.	1886	.25
90	Mary Murphy, s. G.	Colo.	350,000	3,500	101	*				175,000	May.	1888	5.00
91	Matchless, s. L.	Colo.	500,000	500,000	1	*				15,000	Feb.	1890	.00¾
92	May Mazeppa, s.	Colo.	1,000,000	100,000	10					168,000	July.	1891	.01¾
93	Minas Prietas, G. s.	Mex.	1,000,000	100,000	10					350,000	Dec.	1890	.50
94	Minnesota, C.	Mich.	1,000,000	40,000	25	420,000	April	1886	1.00	1,820,000	Mar.	1876	
95	Mollie Gibson, s.	Colo.	5,000,000	1,000,000	5	*				550,000	Sept.	1891	.05
96	Monitor, G.	S. Dak	2,500,000	250,000	10					45,000	Oct.	1890	.03
97	Mono, G.	Cal.	5,000,000	50,000	100	760,000	Sept.	1890	.25	12,500	Mar.	1886	.25
98	Montana, L. G. S.	Mont.	3,300,000	660,000	5	*				2,619,075	June.	1891	.12½
99	Morning Star, s. L.	Colo.	1,000,000	100,000	10					925,000	April	1891	.25
100	Moulton, s. G.	Mont.	2,000,000	400,000	5	*				380,000	Dec.	1887	.07½
101	Mount Pleasant, G.	Cal.	150,000	150,000	1	*				150,000	Feb.	1887	.30
102	Mt. Diablo, s.	Nev.	5,000,000	50,000	100	137,500	June	1880	2.00	180,000	Sept.	1890	.40
103	Napa, Q.	Cal.	700,000	140,000	1	*				420,000	July.	1891	.10
104	Navajo, G. S.	Nev.	10,000,000	100,000	100	500,000	April	1890	.15	229,950	April	1889	.10
105	New California, G.	Colo.	800,000	160,000	5	*				48,800	May.	1890	12½
106	New Guston, s.	Colo.	550,000	110,000	5					785,000	April	1891	1.00
107	N. Hoover Hill, G. s.	N. C.	300,000	120,000	2½					30,000	Dec.	1885	.06¾
108	Northern Belle, s.	Nev.	5,000,000	50,000	100	425,000	Jan.	1884	8.00	2,400,000	April	1883	.50
109	North Belle Isle, s.	Nev.	10,000,000	100,000	100	395,000	April	1890	.30	230,000	May	1888	.50
110	North Star, G.	Cal.	1,000,000	100,000	10					360,000	April	1891	.50
111	Ontario, s. L.	Utah	15,000,000	150,000	100					12,125,000	Aug.	1891	.50
112	Ophir, G. S.	Nev.	10,000,000	100,000	100	4,210,640	April	1890	.50	1,585,800	Jan.	1880	1.00
113	Original, s. C.	Mont.	1,500,000	60,000	25	*				138,000	Jan.	1889	.05
114	Oro, s. L. G.	Colo.	500,000	100,000	5					95,000	July.	1890	.20
115	Osceola, C.	Mich.	1,250,000	50,000	25	480,000	April	1876	1.60	1,547,500	July.	1891	1.00
116	Parrot, C.	Mont.	1,800,000	100,000	18					350,000	May.	1891	.10
117	Peacock, s. G. C.	N. M.	2,000,000	200,000	10					60,000	Nov	1886	
118	Plumas Eureka, G.	Cal.	1,406,250	140,625	10	*				2,548,000	Oct.	1889	.37½
119	Plymouth Con., G.	Cal.	5,000,000	100,000	50	*				2,280,000	Feb.	1888	.40
120	Quicksilver, pref., Q.	Cal.	4,300,000	43,000	100					1,770,161	Jan.	1891	1.50
121	" com., Q	Cal.	5,700,000	57,000	100					643,987	July.	1882	.40
122	Quincy, C.	Mich.	1,000,000	40,000	25	240,000	Dec.	1862		5,920,000	Aug.	1891	5.00
123	Reed National, s. G.	Colo.	500,000	500,000	1	*				50,000	Dec.	1890	.01
124	Rialto, G.	Colo.	300,000	300,000	1	*				13,500	July.	1891	.01¾
125	Richmond, s. L.	Nev.	1,350,000	54,000	25	*				4,332,887	Jan.	1891	.62½
126	Ridge, C.	Mich.	500,000	20,000	25	219,939	Mar.	1886	.50	99,735	Feb.	1890	.50
127	Robinson Con., s. L.	Colo.	10,000,000	200,000	50	*				585,000	Mar.	1886	.05
128	Running Lode, G.	Colo.	1,000,000	4,000,000	1					15,000	June	1891	.00¾
129	Savage, s.	Nev.	11,200,000	112,000	100	6,604,000	Nov.	1889	.50	4,460,000	June	1869	3.00
130	Sheridan, s. G.	Colo.	300,000	3,000	100	*				225,000	Dec.	1890	3.33⅓
131	Shoshone, G.	Idaho	150,000	150,000	1					7,500	April	1883	.01
132	Sierra Buttes, G.	Cal.	2,225,000	122,500	10					1,492,557	April	1888	.12½
133	Sierra Nevada, s. G.	Nev.	10,000,000	100,000	100	6,296,910	May.	1890	.50	102,000	Jan.	1871	1.00
134	Sierra Nevada, s. L.	Idaho	1,000,000	1,000,000	1	*			.75	40,000	May.	1889	.02
135	Silent Friend.	Colo.	500,000	500,000	1					32,500	April	1891	.02½
136	Silver Cord, s. L. G.	Colo.	4,500,000	450,000	10					265,000	April	1889	.10
137	Silver King, s.	Ariz.	10,000,000	100,000	100	130,000	Nov.	1890	.30	1,950,000	July	1887	.25
138	Silver Mg.of L.V.,s.L.	N. M.	500,000	500,000	1	*				375,000	May	1891	.05
139	Small Hopes Con., s.	Colo.	5,000,000	250,000	20	*				3,162,500	Oct.	1890	.10
140	Spring Valley, G.	Cal.	200,000	200,000	1	50,000	Oct.	1886	.25	50,000	Jan.	1891	.25
141	Standard, G. S.	Cal.	10,000,000	100,000	100	100,000	June	1890	.50	3,595,000	June	1888	.05
142	Stormont, s.	Utah	500,000	500,000	1	*				155,000	Nov	1881	.05
143	St. Joseph, L.	Mo.	1,500,000	150,000	10	*				1,974,000	Dec.	1890	.02
144	Tamarack, C.	Mich.	1,250,000	50,000	25	520,000	April	1885	3.00	2,090,000	Aug.	1891	4.00
145	Tombstone, G. S. L.	Ariz.	12,500,000	500,000	25	*				1,250,000	April	1882	.10
146	United Verde, C.	Ariz.	3,000,000	300,000	10					127,500	May.	1890	.10
147	Viola Lt., s. L.	Idaho	750,000	150,000	5	*				337,500	Nov.	1888	.37½
148	Ward Con., s.	Colo.	2,000,000	200,000	10					20,000	Dec.	1889	.05
149	Woodside, s. L.	Utah	100,000	100,000	10					25,000	Oct.	1889	.25
150	W. Y. O. D.	Cal.	30,000	15,000	2	11,250	Feb	1890	.10	4,500	May.	1891	.10
151	Yankee Girl, s.	Colo.	2,500,000	250,000	10					1,405,000	April	1891	.50
152	Yellow Jacket, G. & S.	Nev.	12,000,000	120,000	100	5,508,000	Mar.	1889	.50	2,184,000	Aug.	1871	2.50
153	Young America, G.	Cal.								175,000	Jan.	1889	.10

NON-DIVIDEND PAYING MINES.

	Name and Location of Company.		Capital Stock.	Shares. No.	Par	Assessments. Total levied.	Date and am't of last.		
1	Allegheny, s.	Colo.	$5,000,000	500,000	$10	*			
2	Alliance, s. G.	Utah	100,000	100,000	1	$120,000	Feb.	1891	.20
3	Alloucz, C.	Mich.	2,000,000	80,000	25	737,000	Jan.	1890	.70
4	Alpha Con., G. s.	Nev.	3,000,000	30,000	100	112,500	Sept.	1890	.25
5	Alta, s.	Nev.	10,080,000	100,800	100	3,359,800	Sept.	1890	.50
6	American Flag, s.	Colo.	1,250,000	125,000	10	300,000	June	1887	
7	Amity, s.	Colo.	250,000	250,000	1				
8	Anchor s. L. G.	Utah.	3,000,000	150,000	20	410,000	June	1890	.20
9	Anglo-Montana, Lt.	Mont.	600,000	120,000	5				
10	Astoria, G.	Cal.	200,000	100,000	2				
11	Barcelona, G.	Nev.	5,000,000	200,000	25	*			
12	Bechtel Con., G.	Cal.	10,000,000	100,000	100	173,500		1883	.10
13	Belmont, G.	Cal.	500,000	500,000	1	*			
14	Belmont, s.	Nev.	5,000,000	50,000	100	735,000	April	1886	.10
15	Best & Belcher, s. G.	Nev.	10,080,000	100,800	100	2,279,275	Aug.	1890	.25
16	Black Oak, G.	Cal.	3,000,000	300,000	10	*			
17	Boston Con., G.	Cal.	10,000,000	100,000	100	170,000	Nov.	1882	.25
18	Bremen, s.	N. M.	5,000,000	500,000	10	*			
19	Brownlow, G. s.	Colo.	250,000	250,000	1				
20	Brunswick, G.	Cal.	2,000,000	400,000	5	*			
21	Buckeye, s. L.	Mont.	1,000,000	500,000	2				
22	Bullion, s. G.	Nev.	10,000,000	100,000	100	2,790,000	Dec.	1889	.25
23	Butte & Boston, C. S.	Mont.	5,000,000	200,000					.25
24	Calaveras, G.	Cal.	500,000	500,000	1	*			
25	Carisa, G.	Wy.	500,000	500,000	5	*			
26	Carupano, G. S. L. C.	Ven.	200,000	100,000	2	*			
27	Cashier, G. S.	Colo.	500,000	250,000	2	*			
28	Cherokee, G.	Cal.	1,500,000	150,000	10				
29	Chollar, s. G.	Nev.	11,200,000	112,000	100	1,540,000	Nov.	1889	.50
30	Cleveland, T.	Dak.	1,000,000	500,000	2	*			
31	Colchis, s. G.	N. M.	500,000	50,000	10				
32	Colorado Silver	Colo.	1,625,000	325,000	5				
33	Comstock Tun.	Nev.	10,000,000	100,000	100	35,000	Mar	1887	.15
34	Con. Imperial, G. s	Nev.	5,000,000	50,000	100	1,875,000	July.	1890	.05
35	Con. New York, s. G.	Nev.	5,000,000	100,000	50	70,000	Nov.	1890	.15
36	Con. Pacific, G.	Cal.	6,000,000	60,000	100	198,000	June	1890	.10
37	Con. Silver, s.	Mo.	2,500,000	250,000	10				
38	Crescent, s. L.	Colo.	3,000,000	300,000	10	*			
39	Crocker, s.	Ariz.	10,000,000	100,000	100	150,000	June	1890	.15
40	Crowell, G.	N. C.	500,000	500,000	1	*			
41	Dahlonega, G.	Ga.	250,000	250,000	1				
42	Dandy, s.	Colo.	5,000,000	500,000	10	*			
43	Decatur, s.	Colo.	1,500,000	300,000	5	*			
44	Denver City, s.	Colo.	5,000,000	500,000	10	*			
45	Denver Gold, G.	Colo.	300,000	60,000	5				
46	Dickens-Custer, s.	Idaho	2,100,000	420,000	5				
47	Durango, G.	Colo.	500,000	500,000	1	*			
48	Eastern Dev. Co., Lt.	N. S.	1,500,000	150,000	10	990,000	Mar.	1886	1.00
49	El Cristo, G. S.	U.S.C.	1,000,000	500,000	2				
50	El Dorado, G.	Cal.	1,000,000	250,000	4	*			
51	El Talento, G.	U.S.C.	1,000,000	500,000	2				
52	Emmons, s. L.	Colo.	2,000,000	2,000,000	1	*			
53	Empire, s.	Utah	10,000,000	100,000	100				
54	Eureka Tunnel, s. L.	Nev.	10,000,000	100,000	100	*			
55	Exchequer, s. G.	Nev.	10,000,000	100,000	100	865,000	July.	1890	.25
56	Found Treasure, G. S.	Nev.	10,000,000	100,000	100	81,500	May	1890	.25
57	Gogebic I. Syn., I.	Wis	5,000,000	200,000	25				
58	Gold Cup, s.	Colo.	500,000	500,000	1	*			
59	Golden Era, s.	Mont.	2,000,000	200,000	10	*			
60	Gold Rock, G.	Cal.	1,000,000	500,000	2	*			
61	Goodshaw, G.	Cal.	10,000,000	100,000	100	*			
62	Grand Belt, C.	Tex.	12,000,000	120,000	100				
63	Grand Duke	Colo.	800,000	80,000	10				
64	Great Remance, G.	U.S.C.	1,000,000	500,000	2	*			
65	Gregory Con., G.	Mont.	3,000,000	300,000	10				
66	Harlem M. & M. Co., G.	Cal.	1,000,000	200,000	5				
67	Hattery Con., G.	Cal.	1,000,000	100,000	10	22,000	Oct.	1890	.05
68	Head Cent. & Tr., s. G.	Ariz.	10,000,000	100,000	100				
69	Hector, G.	Cal.	1,500,000	300,000	5	45,000	Jan.	1888	.15
70	Highland, C.	Mich.	500,000	25,000	20				
71	Holywood	Cal.	200,000	100,000	2	*			
72	Hortense, s.	Colo.	2,000,000	200,000	10				
73	Hurcon, C.	Mich.	1,000,000	40,000	25	280,000	May.	1887	3.00
74	Iron, Gold & Silver, s.	N. M.	2,000,000	200,000	10	*			
75	Ironton, I.	Wis.	1,000,000	40,000	25				
76	Iroquois, C.	Mich.	1,250,000	50,000	25				
77	J. D. Reymert, s.	Ariz.	10,000,000	100,000	100				
78	Julia Con., G. s.	Nev.	11,000,000	110,000	100	1,463,000	Jan.	1889	.10
79	Lacrosse, G.	Colo.	1,000,000	100,000	10	*			
80	Lee Basin, s.	Colo.	5,000,000	500,000	10	*			
81	Madeleine, G. S. L.	Colo.	750,000	750,000	1	*			
82	Mammoth Gold, G.	Ariz.	245,000	49,000	5	*			
83	Mayflower Gravel, G.	Cal.	1,000,000	100,000	10	585,000	Mar.	1890	.56
84	Medora, G.	Dak.	250,000	250,000	1				
85	Merrimac Con., G. S.	Colo.	5,000,000	500,000	10	*			
86	Mexican, G. S.	Nev.	10,000,000	100,000	100	2,791,960	Oct.	1890	.25
87	Middle Bar, G.	Cal.	400,000	200,000	2	*			
88	Mike & Starr, S. C.	Colo.	1,000,000	200,000	5	*			
89	Milwaukee, s.	Mont.	500,000	500,000	1	12,500	May.	1891	.01
90	Monitor, G.	Colo.	100,000	1,000,000	1	*			
91	Mutual Mg. & Sm.	Wy'ah.	100,000	100,000	1	*			
92	Native, C.	Mich.	1,000,000	40,000	25				
93	Neath, G.	Colo.	1,000,000	100,000	10				
94	Nevada Queen, s.	Nev.	10,000,000	100,000	100	200,000	Oct.	1888	.25
95	New Germany, G.	N. S.	100,000	100,000	1	*			
96	New Pittsburg, s. L.	Colo.	2,000,000	200,000	10	*			
97	N. Commonw'th, s.	Nev.	10,000,000	100,000	100	85,000	April	1890	.25
98	North Standard, G.	Cal.	10,000,000	100,000	100	20,000	Nov.		
99	Noonday.	Cal.	600,000	60,000	10	208,000	Dec.	1881	.10
100	Oneida Chief, G.	Cal.	500,000	125,000	100	*			
101	Oriental & Miller, s.	Nev.	10,000,000	400,000	25	*			
102	Osceola, G.	Nev.	5,000,000	500,000	10				
103	Overman, G. S.	Nev.	11,520,000	115,200	100	3,832,800	Dec.	1888	.25
104	Park, s.	Utah.	2,000,000	200,000	10				
105	Peer, s.	Ariz.	10,000,000	100,000	100	165,000	Oct.	1890	.10
106	Peerless, s.	Ariz.	10,000,000	100,000	100	405,000	Oct.	1890	.15
107	Phœnix	Ariz.	500,000	500,000	1	*			
108	Phœnix Lead, s. L.	Colo.	100,000	100,000	1	*			
109	Pilgrim, G.	Cal.	600,000	300,000	2	*			
110	**Ploche M. &R., s. G. L.	Nev.	20,000,000	2,000,000	10				
111	Potosi, s.	Nev.	11,

STOCK MARKET QUOTATIONS.

Aspen. Oct. 2.

The closing quotations were as follows:

	H.	L.
Argentum Juniata	$1.25	$1.14
Aspen Deep Shaft	....	.15
Aspen Favorite	....	....
Best Friend	.26	.20
Bushwacker	.40	.38
Della S.	....	....
Homer & Alta	....	....
Justice	.20	....
Little Annie	.20	....
Mollie Gibson	6.50	4.20
Nolan Creek	.10	....
Park, Mamie & Queen	....	....
Pontiac	.12½	.12½
St. Joe & Mineral Farm	.20	.18

Baltimore, Md. Oct. 8.

COMPANY.	Bid.	Asked.
Atlantic Coal	$....	$1.30
Balt. & N. C.	.01	.03
Big Vein Coal	....	....
Conrad Hill	....	....
Cons. Coal	.27	.28¼
Diamond Tunnel	....	....
George's Creek Coal.	1.07	1.15
Lake Chrome	.10	.40
Maryland & Charlotte	....	....
North State	....	....
Silver Valley	.55@.57	.70

Birmingham, Ala. Oct. 7.

COMPANY.	Bid.	Asked.
Ala. Coal & Iron Co	$102	$102½
Ala. Con. C. & C. Co.	....	$23
Ala. Roll. Mill Co.	$100	$105
*Alice Furnace	$100	....
Anna Howe G. Mg. Co.	$⅞	$⅝
Bessemer Land	$26½	$29
Bir. Mg. & Mfg.	....	$35
Cahaba Coal Mg. Co.	....	$61
Camille Gold Mg. Co.	$¾	$1
De Bardeleben Coal & Iron Co.	$31½	$34
Decatur L. & Imp. Co.	$83¾	$9⅛
Decatur Min. L.	....	$19
Ensley Land	$7½	$9
*Eureka	....	....
Florence L. & Mg. Co.	$14¾	$16½
Gadsen Land	$3⅝	$3⅞
Hecla Coal Co.	....	....
Hen. S. & M. Co.	$2¾	$4¼
Jagger-Townl'y C. & C. Co.	$8½	$10
Mag-Ellen	$100	....
Mary Lee C. & R. Co.	....	$25
Sheffield C. & I. Co.	$52½	$55
Sloss I. & S.	$19	$23
†Sloss I. & S.	$85	$87
‡‡ Sloss I. & S.	$49	$52½
Ten. C. & I. Co.	$33	$34
" pref.	$86	$88
Tuscaloosa Coal, Iron & Land Co.	$23	$25
Vulcan C. & C. Co	$5	$7½
Woodstock Iron Co.	$28	$29

* Bonds. † First mortgage bonds. ‡‡ Second mortgage bonds.

Pittsburg, Pa. Oct. 8.

COMPANY.	Bid.	Asked.
Allegheny Gas Co.	$	$. ...
Bridgewater Gas Co.	....	....
Chartiers Val. Gas	4.50	6.00
Columbia Oil Co.	....	....
Consignee Mining Co.	....	....
Consolidated Gas Co.	....	....
East End Gas Co	....	....
Forest Oil	....	....
Hazlewood Oil Co.	....	....
Hidalgo Mining Co.	3.00	4.00
La Noria Mining Co.	.25	.25
Luster Mining Co.	....	11.88
Mansfield C. & C. Co.	....	....
Manufacturers Gas Co.	....	25.50
Nat. Gas Co. of W. Va	....	....
N. Y. & Clev. Gas Coal Co	36.50@37.00	41.00
Ohio Valley Gas Co.	....	....
Pennsylvania Gas Co.	....	....
People' Natural Gas Co.	....	....
People's N. G. & P. Co.	7.50	....
Philadelphia Co	11.50	11.75
Pine Run Gas Co	....	....
Pittsburg Gas Co.	....	....
Red Cloud Mining Co	2.63	3.25
Silverton Mining Co.	....	....
South Side Gas Co.	....	....
Sterling Silver Mining Co.	....	....
Tuna Oil Co	....	....
Union Gas Co.	....	....
Washington Oil Co.	....	....
W'moreland & Camb.	....	....
Wheeling Gas Co.	20 00	21.50

Trust Receipts.

Sales at the New York Stock Exchange for week ending Oct. 9:

	Sales.	Price H.	Price L.
American Cotton Oil	....	....	....
National Lead	2,700	17	16⅞

Trust Stocks. Oct. 9.

Special report by C. I. Hudson & Co., members New York Stock Exchange. The following are the closing quotations:

CERTIFICATES.	
Am. Cotton Oil, Com	$25 @$26
" " " Pfd	46¾@ 48
Am. Sugar Refineries, Com	88½@ 89
" " " Pfd	95½@ 96
Distillers' & Cattle Feeders'	52¼@ 52¾
Linseed Oil	25 ....
National Cordage, Com	95 @ 95½
" " Pfd	99¾@100¾
National Lead	16¾@ 16⅞
Standard Oil	157 @158
W. U. Beef Co.	12¼@ 14

St. Louis. Oct. 7.

CLOSING PRICES.

COMPANY.	Bid.	Asked.
Adams, Colo.	$1.85	$1.90
American & Nettie, Colo	.40	.42½
Aztec, N. Mex	....	.05
Bi-Metallic, Mont.	34.00	35.00
Central Silver	04	.05¼
Elizabeth, Mont.	1.85	1.90
Granite Mountain, Mont.	21.00	21.50
Montrose Placer, Colo.	.27½	.30
Mickey Breen	.50	....
Small Hopes, Colo.	.50	....
Silver Age	.88¾	1.00
Yuma, Ariz	.37½	.42½

Helena, Mont.

(Special report by SAMUEL K. DAVIS.)

Prices highest and lowest for week ending Sept. 26, 1891:

	L.	H.
Bald Butte (Mont.)	1.90	2.25
California (Castle), Mont.	....	....
Champion (Ora Fino), Mont.	....	....
Cleveland & Anchor, Idaho.	....	....
Combination (Phillipsb'g), Mont	.75	1.00
Copper Bell (Cataract), Mont.	.09	.12½
Cumberland (Castle), Mont	2.10	2.50
Elizabeth (Phillipsburg), Mont.	2.00	2.40
Florence (Neihart), Mont.	....	....
Fourth of July, Wash.	....	....
Glengary (Butte), Mont.	1.25	1.50
Great Eastern (Castle), Mont	....	....
Helena & Victor, Mont.	1.50	2.25
Hiawatha (Cataract), Mont.	.02	.05
Iron Mountain (Missoula), Mont	.75	.85
Jersey Blue (Butte)	....	....
Judge (Castle), Mont.	....	....
Jumbo (Castle), Mont.	....	....
Lone Pine (Vipond), Mont.	....	....
Mac (Unionville), Mont	.25	.15
Milwaukee (Butte), Mont.	.02	.07½
None Such (Unionville), Mont.	....	....
O. R. & N. (Missoula), Mont.	.05	.07½
Poorman (Cœur d'Alene), Idaho	1.05	1.25
Queen of the Hills (Neihart)	....	....
Silver Arrow (Cataract), Mont.	....	....
Silver Crown (Ora Fino), Mont.	....	....
Southern Cross (Deer Lodge), Mont	.20	.25
Wall Street (Elliston), Mont.	....	....
West Cumberland (Castle), Mont.	....	....
Yellowstone (Castle), Mont.	.25	.50

Foreign Quotations.

London. Sept. 26.

COMPANY.	Highest.	Lowest.
Amador, Cal.	4s. 6d.	4s.
American Belle, Colo.	10s.	9s. 6d.
Appalachian, N. C.	3d.	1½d.
Colorado, Colo.	2s. 6d.	1s. 6d.
Cons. Esmeralda, Nev.	2s.	1s. 6d.
De Lamar, Idaho	25s.	24s.
Dickens Custer, Idaho.	2s. 3d.	1s. 9d.
East Arevalo, Idaho.	....	....
Elkhorn, Mont.	£1 15-16	£1 13-16
Elmore, Idaho	9d.	3d.
Emma, Utah	1s. 9d.	1s. 3d.
Flagstaff, Utah	5s. 6d.	5s.
Garfield, Nev	2s.	1s. 6d.
Golden Feather	18s.	17s.
Golden Gate, Cal.	£1 15-16	£1 13-16
Golden Leaf, Mont	4s. 3d.	3s. 9d.
Golden River, Cal.	....	....
Jay Hawk, Mont.	6d.	3d.
Josephine, Cal.	....	....
Kohinoor, Colo.	1s. 3d.	9d.
La Luz, Mex	....	....
La Plata, Colo.	1s. 3d.	1s.
La Valera, Mex.	3s. 6d.	2s. 6d.
Maid of Erin, Colo.	....	....
Mammoth Gold, Ariz.	....	....
Montana, Mont.	8s.	7s. 6d.
New California, Colo.	3s. 6d.	3s.
New Consolidated	6d.	3d.
New Eberhardt, Nev.	1s. 3d.	9d.
New Gold Hill, N. C.	1s. 3d.	9d.
New Guston, Colo.	£3⅛	£2⅝
New Hoover Hill, N.C.	6d.	3d.
New Russell, N. C.	1s.	9d.
New Viola, Idaho	6d.	3d.
Old Lout, Colo	£3-16	£1-16
Parker Gold, N. C.	1s.	6d.
Pittsburg Cons., Nev	4s.	3s.
Richmond Con., Nev.	£1⅛	£⅞
Ruby, Nev	6d.	3d.
Sam Christian, N. C.	....	....
Sierra Buttes, Cal.	£5-16	£3-16
" Plumas Eur., Cal.	£9-16	£7-16
United Mexican, Mex.	5s.	3s.
U. S. Placer, Colo.	....	....
West Argentine, Colo.	1s.	9d.
Yankee Girl, Colo.	16s. 6d.	16s.

Paris. Sept. 17.

	Francs.
East Oregon, Ore.	4.00
Forest Hill Divide, Cal.	....
Golden River, Cal.	130.00
" " parts	30.00
Laurium	787.50
Lexington, Mont	95.00
" parts	2.50
Nickel	827.50
Rio Tinto, Spain	583.12
" " oblig.	510.00
" " "	512.50
Tharsis, Spain	163.75
Uielle-Montagne	516.25

CURRENT PRICES.

Those quotations are for wholesale lots in New York unless otherwise specified.

CHEMICALS AND MINERALS.

Acid—Acetic, No. 8, pure, 1,040, ℔ lb....05
Commercial, in bbls. and cbys. 01¾@.02¼
Carbonic, liquefied, ℔ lb. .30
Chromic, chem pure .90
for batteries .40
Hydrobromic, dilute, U. S. P. .25
Hydrocyanic, U. S. P. .45
Hydrofluoric .20
Alcohol—95%, ℔ gall. $2.30@$2.40
Absolute $3.80
Ammoniated $2.80
Alum—Lump, ℔ lb. .016@.017
Ground, ℔ lb. .0165@.0175
Powdered .04½@.05
Lump ℔ ton, Liverpool £5
Aluminum—℔ lb. .50
Aluminum Chloride—Pure, ℔ lb. $1.25
Amalgamating solution, ℔ lb. .60
Sulphate .01½@.03
Ammonia—Sul., in bbl. lots, ℔ lb 03 1-16
Carbonate, ℔ lb. .14
Muriate, white, in bbls., ℔ lb. .08½
Aqua Ammonia—(in cbys) 18° ℔ lb .03½
20°, ℔ lb. .04¾
26°, ℔ lb .07½
Antimony—Oxymur, ℔ lb. .04¾
Ore, Hallett's, ℔ lb. .1075
Cookson's, ℔ lb. .1325
Regulus, Hallett's, ℔ ton, London £42 10
Argols—Red, powdered, ℔ lb. .15
Arsenic—White, powdered ℔ lb. 02¾@.03
Red ℔ lb. .05@.06¼
Yellow .08@.09
White at Plymouth, ℔ ton £12 2 6
Asbestos—Canadian, ℔ ton $50@$300
Italian, ℔ ton, c. i. f. L'pool £18@£60
Ashes—Pot, 1st sorts, ℔ lb. .0475@.05
Pearl .06@.06¼
Asphaltum—
Prime Cuban, ℔ lb. .01@.05½
Hard Cuban, P ton $28.00
Trinidad, refined, ℔ ton $30.00
Egyptian, ℔ lb. .08@.09
Californian, at mine, ℔ ton $12.00
at San Francisco, ℔ ton. $15.00
Barium—Carbonate, pure, ℔ lb. .45
Carbonate, commercial, ℔ lb .05@.10
Chlorate, crystal. ℔ lb. .75
Chloride, commercial, ℔ lb. .05@.10
pure, ℔ lb. .16
Iodide, ℔ oz. .40
Nitrate, powdered, ℔ lb. .15
Sulph., Am. prime white, ℔ ton. $21@$23
Sulph., foreign, floated, ℔ ton $21.50@$23.50
Sulph., off color, ℔ ton .$11.50@$14.00
Carb., lump, f. o. b. L'pool, ℔ ton .£6
No. 1, Casks, Runcorn, " " £4 10 0
No. 2, bags, Runcorn, " " £3 15 0
Bauxite—℔ ton $10.00
Bichromate of Potash—Scotch, ℔ lb .10@.12
American, ℔ lb. .03½@.10
Bichromate of Soda—℔ lb. .08½@.11½
Borax—Refined, ℔ lb., in car lots, San Francisco .08
Concentrated, in car lots .03
Refined, Liverpool ℔ ton £29
Bromine—℔ lb. .40
Cadmium Minion—℔ lb. $2.00
Cadmium Iodide—℔ lb. $5.50
Chalk—℔ ton $1.75
Precipitated, ℔ lb. .05@.06
China Clay—English, ℔ ton $13½@$21.00
Southern, ℔ ton .$13.50
Chlorine Water—℔ lb. .10
Chrome Yellow—℔ lb. .10@.25
Chrome Iron Ore—℔ ton, San Francisco .$10.00
Chromalum—Pure, ℔ lb. .40
Commercial, ℔ lb. .12
Cobalt—Oxide, ℔ lb. $2.50@$2.90
Copper—Sulph. English Wks. ton £20@£21
Vitriol (blue), ordinary .03½@.03¾
" " extra .01
Nitrate, ℔ lb. .40
Copperas—Common, ℔ 100 lbs. .85
Best, ℔ 100 lbs. .85@$1.00
Liverpool, ℔ ton, in casks £2
Corundum—Powdered, ℔ lb. .04½@.09
Flour, ℔ lb. .03
Cryolite—Powdered, ℔ lb., bbl. lots. .08
Emery—Grain, ℔ lb. (℔ kg.) .04½@.05
Flour, ℔ lb. .02½@.10
Epsom Salt—℔ lb. .01¾
Feldspar—Ground, ℔ ton $20.00
Fluorspar—Powdered, No. 1, ℔ ton. $30.00
French Chalk—
Fuller's Earth—Lump, ℔ bbl. .90@.95
Glauber's Salt—in bbls., ℔ lb. .0075
Glass—Ground, ℔ lb. .10
Gold—Chloride, pure, crystals, ℔ oz. $12.00
pure, 15 gr., c. v., ℔ doz. $5.40
liquid, 15 gr., g. s. v., ℔ doz. $5.50
Chloride and sodium, ℔ oz $6.00
15 gr., c. v., ℔ doz. $2.88
Oxide, ℔ oz. $27.25
Gypsum—Calcined, ℔ bbl. $1.25@$1.50
Land Plaster
Iodine—Resublimed $3.35@$4.00
Iron—Nitrate, 40°, ℔ lb .01½
47°, ℔ lb .02½
Kaolin—*See China Clay.*
Kieserite—℔ ton $9@$10
Lead—Red, ℔ lb. .06¾@.07¼
White, American, in oil, ℔ lb. .05½@.07¼
White, English, ℔ lb. .08¾@.09
Acetate, or sugar of, white .12@.13
Granulated
Nitrate .09@.10
Lime Acetate—Am. Brown. $1.10@$1.20
" Gray. $2.00@$2.15
Litharge—Powdered, ℔ lb. .06½@.07¼
English flake, ℔ lb. .09@.09½
Magnesite—Crude, ℔ ton of 1,015 kilos $14 75
Calcined, ℔ ton of 1,015 kilos. $23.75
Brick, ℔ ton of 1,015 kilos. $50.00
Manganese—Ore, per unit. 23@.28
Oxide, ground, per lb. .02½@.06¾
Marble Dust—℔ bbl. $1.25
Mercuric Chloride—(*Corrosive Sublimate*) ℔ lb. .84
Powdered, ℔ lb. .94
Metallic Paint—Brown ℔ ton. $20@$25
Red $20@$25
Mineral Wool—Ordinary slag. .01¼
Ordinary rock .02½
Ground, ℔ ton
Mica—In sheets according to size.
1st quality, ℔ lb. .25@$6.00
Naphtha—Black
Nitre Cake—℔ ton $10.00
Ochre—Rochelle, ℔ lb. $1.35@$1.81
Washed Nat Oxf'rd, Lump, ℔ lb. 06¼@.06¾
Washed Nat Oxf'rd, Powder, ℔ lb. 07@.07½
Golden, ℔ lb. .03¾@.04
Domestic, ℔ lb. .03¾@.01½
Oils, Mineral—
Cylinder, light filtered, ℔ gal. .15@.20
Dark filtered, ℔ gal. .11@.15
Extra cold test, ℔ gal. .18@.20
Dark steam refined, ℔ gal. 1C@.18
Phosphorus—℔ lb. .55@.60
Precip., red, ℔ lb .88
white, ℔ lb. .93
Plumbago—Ceylon, ℔ lb. .04@.05
American, ℔ lb. .05@.07
Potassium—Cyanide, ℔ lb., C. P. .70
67%, ℔ lb .45
50%, ℔ lb. .40
Bromide, ℔ lb .24@.25
Chlorate, English, ℔ lb. 10½@.11
Chlorate, powdered, ℔ lb. .13@.14
Carbonate, ℔ lb., by casks, 85% .05½
Caustic, ℔ lb., pure stick .35@.40
Iodide, ℔ lb. $2.58@$2.62
Nitrate, refined, ℔ lb .06@.08
Bichromate, ℔ lb .095@.10
Yellow Prussiate, ℔ lb. .23¼@.24½
Red Prussiate, ℔ lb. .40@.45
Pumice Stone—Select lumps, lb. .04
Original cks., ℔ lb. .01¾@.02
Powdered, pure, ℔ lb. .02@.02½
Pyrites—Non-cupreous, p. units. .12@.15
Quartz—Ground, ℔ ton. $14.00@$16.00
Rotten Stone—Powdered, ℔ lb. .03¼
Lump, ℔ lb. .5½@.15
Original cks, ℔ lb .04½@.05¼
Rubbing stone, ℔ lb .07
Sal Ammoniac—in bbls., ℔ lb. .10¼
Salt—Liverpool, ground, ℔ sack .70
Domestic, fine, ℔ ton $7@$7.50
Common, fine, ℔ ton $4.50@$5
Turk's Island, ℔ bush .26@.28
Salt Cake—℔ ton $10 00
Saltpeter—Crude, ℔ lb. .03¾@.04¼
Soapstone—
Sodium—Prussiate, ℔ lb. 17½@.18
Phosphate, ℔ lb. .07@.18
Stannate, ℔ lb. .08@.15
Tungstate, ℔ lb.
Caustic, ℔ lb.
Hyposulphite, ℔ lb., in casks .024
Strontium—Nitrate, ℔ lb. .09½@.10
Sulphur—Roll, ℔ lb. .02½
Flour, ℔ lb. .02½@.02¾
Sylvinit, 23@27%, S. O. P., per unit. 40@.42½
Talc—Ground French, ℔ lb. .01¼@ 01½
Terra Alba—French .90@$1.00
English .75@.80
American, No. 1
American, No. 2 .40@.50
Domestic, ℔ ton $18@$20
c. i. f. Liverpool, ℔ ton £4 5s.
Tin—Crystals, in kegs or bbls. .14@.15
feathered or flossed. .25
Muriate, single .07
Double or strong, 51° B. .09
Oxy. or nitro .10
Tin Plates, ℔ box, Swansea, best charcoal .18@.19
best coke 15@.16
Vermillion—Imp. English .90 @ .95
Am. quicksilver, bulk .87 @—
Am. quicksilver, bags .68 @ .71
Chinese .95 @$1.00
Trieste .90 @ .95
American 11¼@ .12
Artificial .08 @ .35
Zinc White—Am., Dry, ℔ lb .04½
Antwerp, Red Seal, ℔ lb. .07¼
Paris, Red Seal, ℔ lb .08½
Muriate solution .06
Sulphate crystals, in bbls., ℔ lb. .03¾

THE RARER METALS.

Arsenic—(Metallic), per lb. .40
Barium—(Metallic), per gram. $1.00
Bismuth—(Metallic), per lb. $2.40
Cadmium—(Metallic), per lb. $1.00
Calcium—(Metallic), per gram. $10.00
Cerium—(Metallic), per gram. $7.50
Chromium—(Metallic), per gram. $1.00
Cobalt—(Metallic), per lb. $6.00
Didymium—(Metallic), per gram. $9.00
Erbium—(Metallic), per gram. $7.50
Gallium—(Metallic), per gram. $140.00
Glucinum—(Metallic), per gram. $12.00
Indium—(Metallic), per gram. $9.00
Iridium—(Metallic), per oz. $7.00
Lanthanum—(Metallic), per gr. $10.00
Lithium—(Metallic), per gram. $10.00
Magnesium—(Powdered), per lb. $1.00
Manganese—(Metallic), per lb. $1.10
Chem. pure, per oz. $10.00
Molybdenum—(Metallic), per gm .50
Niobium—(Metallic), per gram. $5.00
Osmium—(Metallic), per oz. $65.00
Palladium—(Metallic), per oz. $35.00
Platinum—(Metallic), per oz., $16.50@$20.00
Potassium—(Metallic), per lb. $28.00
Rhodium—(Metallic), per gram. $5.00
Ruthenium—(Metallic), per gm. $5.50
Rubidium—(Metallic), per gram. $2.00
Selenium—(Metallic), per oz. $1.80
Sodium—(Metallic), per lb. $2.50
Strontium—(Metallic), per gm. .60
Tantalum—(Metallic), per gram. $9.05
Telurium—(Metallic), per lb. $5.00
Thallium—(Metallic), per gram. .20
Titanium—(Metallic), per gram. $2.20
Thorium—(Metallic), per gram. $17.00
Tungsten—(Metallic), per lb. $1.00
Uranium—(Oxide), per lb. $5.00
Metallic, per gm. .20
Vanadium—(Metallic), per gm. $22.00
Yttrium—(Metallic), per gram. $9.00
Zirconium—(Metallic), per oz. $65.00